CONTENTS

FOREWORD

This booklet contains reports written by Examiners on the work of candidates in certain papers. **Its contents are primarily for the information of the subject teachers concerned**.

DESIGN AND TECHNOLOGY

Grade thresholds taken for Syllabus 0445 (Design and Technology) in the November 2005 examination

	maximum mark available	minimum mark required for grade:			
		A	C	E	F
Component 1	100	67	56	38	32
Component 2	100	44	31	21	17
Component 3	100	39	28	20	15
Component 4	100	35	25	20	15
Component 5	120	88	64	50	38

The threshold (minimum mark) for B is set halfway between those for Grades A and C. The threshold (minimum mark) for D is set halfway between those for Grades C and E. The threshold (minimum mark) for G is set as many marks below the F threshold as the E threshold is above it. Grade A* does not exist at the level of an individual component.

Grade Thresholds are published for all GCE A/AS and IGCSE subjects where a corresponding mark scheme is available.

Paper 0445/01

Common Core

General comments

Candidates were able to access all questions in ***Part A*** but naturally with varying degrees of success. Candidates are now developing sound product analysis skills and are able to apply their knowledge to a range of situations. It is important that they continue to be specific when referring to materials, construction techniques and finishes as generic responses gain few if any marks.

Answers to the ***Part B*** questions were generally set out well so that the Examiner was able to identify clearly the responses to each part of the question. Centres are reminded that all answers to the chosen ***Part B*** question should be on the A3 drawing paper as stated in the rubric. Unfortunately a few candidates responded on the question paper and this made their design drawings very difficult to follow.

The Examiner would like to thank Centres for despatching scripts in correct candidate order.

Comments on specific questions

Part A

Question 1

Most candidates were able to represent the car sales information in one form or another and gain some marks. Some form of bar chart was probably the most successful and marks were awarded for the accuracy of the information and the quality and clarity of communication skills.

Question 2

(a) Very few candidates were unable to identify two dangerous or uncomfortable parts on the tricycle with the seat, pedals and handlebars being the most common.

(b) Most candidates were able to provide improvements to the problems identified and the Examiner was able to award full marks in most cases. It is important that candidates annotate their sketches when this is asked for in the question.

Question 3

Candidates were generally familiar with appropriate materials and finishes for the range of uses gi table.

Paint was the most popular correct answer for the steel swing with some candidates correctly identifyi plastic coating.

Varnish was the standard accepted finish for the garden furniture although the Examiner was pleased when candidates identified oil or even stated that teak required no applied finish to remain in good order outside.

Most candidates gave stainless steel as an appropriate material for the cutlery although some identified specific plastics or went as far as stating silver. The Examiner was happy to accept any of these.

The Examiner was not prepared to accept varnish as a suitable finish for the pine fence but any other finish that would act as a preservative outside was accepted.

Question 4

Some candidates responded incorrectly by describing energy conversion processes although the question asked for ways by which energy can be lost in these situations. Correct answers explained wastage through friction or the generation of heat or sound.

Question 5

(a) The majority of candidates were able to identify a permanent method of joining wood to wood by giving any accepted joint or the use of glue. Screws and nails were not accepted unless used with some form of adhesive. Permanent methods for metal to metal were welding, soft and hard soldering or riveting and these were all accepted.

(b) Candidates were expected to identify some form of screw fixing for the metal shelf bracket and then to go on to sketch details of this. Bolts and nuts were not accepted as their appearance on the outside of a wooden cupboard would not be acceptable.

Question 6

(a) Many candidates sketched some form of pendulum for the oscillating motion and this was correct. Any other example was accepted so long it was absolutely clear that this type of motion moves or swings about a fixed central point.

(b) Unfortunately many candidates gave examples of reciprocating motion for which they could be awarded one mark only. Correct answers indicated that linear motion is a straight line in one direction.

Question 7

Most candidates were able to draw a block of material with dimensions showing 500 as the length, 150 as the width and 30 as the thickness. Where dimensions were not included but the drawing was in correct proportion then one mark was awarded.

Question 8

This question was answered the least successfully although the beam was, in fact, loaded in a very simple way. A simple correct calculation gave the reaction at **A** as 12.5 N and **B** as 37.5 N. It is important that candidates include evidence of the calculation in this type of question as one mark could be awarded even if the answers to the two reactions were incorrect.

Question 9

Most candidates were able to put the stages of production in the correct order, following the receipt of a customer order as: Design; Order materials; Manufacture and Despatch.

Question 10

Candidates were asked to explain two examples of the use of anthropometrics in the design of a chair but for full marks the Examiner expected a direct link between a part of the human body and a part of the chair. For example, a common correct response was the height of the chair seat being linked to the distance between the foot and the knee.

Part B

Question 11

This question was aimed at those candidates taking the Realisation option and, as such, was by far the m popular. Solutions to the problem covered a wide range of construction and production methods through the use of specific woods, metals and/or plastics.

(a) Candidates had little difficulty listing four points about the function of the umbrella storage system including: stable in use; easy to clean; keep water off floor; collects water; easy to access umbrellas; security; taking a range of sizes etc.

(b) When candidates are asked for points about the appearance of a product there is always the risk of them giving generic responses that could apply to many items. Acceptable responses included: easy to identify; fits in with the style and colour of the local environment; not too bulky; smooth edges etc.

(c) The Examiner is pleased to report that fewer candidates than in the past restricted their design ideas to a single theme. Most were able to present a wide range of ideas and added meaningful notes about the function of their design ideas and the types of material and construction that might be used. Although there is no intention to specify the number of ideas presented, candidates should be able to gain maximum marks through three or four well-communicated designs if they are different in nature and include meaningful detail and annotation. This section presents the opportunity for candidates to 'think with a pencil' and to be as brave as they wish in the creation of design ideas.

(d) Many candidates thoroughly evaluated their design and successful candidates often set these out in list or bullet point fashion referring to the requirements of the design problem and specification points made earlier in the question. Candidates are reminded of the need to give reasons for the choice of ideas for development. Candidates either evaluated alongside drawings as they were progressed or created a separate section after the ideas stage. Again this year candidates from a few Centres produced a table awarding points as to how well each design idea matched the specification points listed in part **(a)**. As was explained before, this method can only be awarded maximum marks if candidates explain how the points are scored and how they make their final decision.

(e) For the award of high marks candidates are required to provide sufficient information from which a skilled person could make the design. This should be in the form of detailed drawings including dimensions and details of all constructions. Any appropriate projection method or combination of methods can be used. It is pleasing to report that there were fewer cases of candidates simply repeating drawings from the design creation section of their work and final drawings were often accompanied by additional drawings of parts of the construction. This section of the question carries the highest proportion of marks and as such should be given an appropriate amount of time.

(f) Fewer candidates than in the past gave generic terms such as wood, metal and plastic and specific materials were correctly identified along with the characteristics or properties that made them particularly suitable.

(g) The Examiner is pleased to report that fewer candidates are now attempting to make the whole product and successful responses focused on just one, often small, part of the solution, as suggested in the question. Responses from successful candidates made it obvious that they were familiar with the appropriate range of production methods, materials and equipment. Some candidates described the process through the use of annotated sketches and this was successful.

Question 12

This question was intended for those candidates who had followed the Graphics option and was the most popular. Although candidates considered many aspects of coffee shop design they tended to track of the fact that they had been asked to make a model of their final idea for the competition. As s their designs overlooked aspects linked to the production of a model and this applied particularly in consideration of materials and constructions. Outcomes often lacked the detail required of a task of this kind.

(a) Candidates identified successfully facilities required for a coffee shop and these included: tables and chairs; serving counter or bar; outside sitting area; toilets; music etc.

(b) It was here that many candidates overlooked the fact that they were to design a model and gave materials that might be used in the construction of a full size coffee shop. Acceptable materials were: paper; card; balsa wood; plastics sheet; polystyrene block; clay; plasticine, etc. The use of a computer was also given credit.

(c)(d)(e) See **Question 11 (c)-(e)**.

(f) Surprisingly many candidates struggled to explain how a computer might assist in the design of a model. Successful candidates covered uses such as: easy to make design changes; use of colour; 3D viewing; designs straight to a machine (CAM); access to information etc.

(g) It was disappointing to see so few good descriptions of how the model would be constructed. Many of the answers were vague descriptions of how the full size coffee shop might be made and made no reference to a model.

Question 13

This was the least popular question but obviously appealed to those candidates who wished to take a more technological approach to their design question. Several went as far as making significant changes to the design of the bus seat so that passengers could be warned of their destination. Unfortunately many candidates focused on the system to be used and overlooked the need to give detailed consideration to the nature of the made product.

(a) Candidates successfully identified important points about the function of the personal warning system including: reliability; lightweight; minimal disturbance to others; unobtrusive; battery operated etc.

(b) Some imaginative output devices were suggested such as: buzzer; small electric shock; vibrator; music; puff of air etc.

(c)-(g) See **Question 11 (c)-(g)**.

Question 14

This question appealed to those candidates who lived in an area where this was an everyday problem although it was only the third most popular. Candidates suggested many different ideas for hanging washing although not all were appropriate for hanging out of a window as asked for in the question.

(a) Important functions for the drier suggested by candidates included: simple to operate; easy to store; could be lifted easily; hold maximum amount of clothing; does not block out light etc.

(b) Most candidates were able to identify several safety issues such as: parts must not fall off; operated without hanging out of window; well secured in use; safety locking device; child proof etc.

(c)-(g) See **Question 11 (c)-(g)**.

Paper 0445/02
Communication

General comments

The standard of work was comparable to that of the previous November session. **Questions 1** and **2** were the two most popular questions for candidates.

There are areas of the syllabus however, in which further improvements are needed. These include in particular, the construction of common geometrical shapes. Drawing views in orthographic projection and the sketching of ideas for packaging are also areas for improvement.

Comments on specific questions

Question 1

Packaging for six choc bars

This was the second most popular question. Most candidates gained marks for their answers to all sections of this question.

(a) Up to three marks were given for the quality of the design sketches. Some candidates drew only one idea solution scoring only two marks out of the four available. Many candidates failed to show details of the arrangement of six bars in their sketch.

(b) The drawing of the development of the chosen packaging was not evident from very many candidates. Of those who drew a development, many solutions were not to full size and failed to score the six marks for accurate sizes. A large number of candidates drew a large pictorial view of a hexagon or a rectangular box. Pictorial views that would hold six bars and were correctly sized scored the maximum two marks available. The evidence of sufficient glue flaps of a suitable size scored four marks.

(c) Marks were awarded for effective colour/shade (3) and quality of presentation (2). The overall 'fit for purpose' mark (3) was awarded to the general design concept of the packaging.

Question 2

Concrete hotel sign

This was by far the most popular question. Many candidates were attracted to this question by the lettering of the word *hotel*. Most responses included a plan in the correct position. Only a few candidates dimensioned the orthographic views to BSI convention.

(a) Most candidates scored maximum mark (2) for the height and width of the letters. Three marks were awarded for the accuracy of each letter, 'O' being the most difficult. Most candidates scored marks for equi-spaced (1) and same style (1)

(b) Most candidates drew the plan in the correct position (2) giving the base the correct size (2). Hidden detail, where the rectangular prism crossed the base (2) was not always included. Three marks were available for drawing the hexagonal prism in hidden detail and three marks for drawing the rectangular base in the correct orientation and size. Many candidates drew the circle to represent the cylinder and cone (2), but failed to draw in the centre lines for two marks.

(c) Many candidates applied dimensions to the two given views. Candidates had to dimension ten major parts of the sign to gain full marks (5). Up to three marks were awarded for dimensioning in accordance with BSI (size printed above dimension line/viewed from the right/use of Ø to prefix a diameter size).

Question 3

Biscuit box insert

This was the least popular question on the paper. Of those who attempted it, many failed to gain high ma

(a) The quality of sketching provided by candidates did not warrant the award of high marks. There was little investigation of alternative layouts evident in candidate responses

(b) Most candidates managed to construct an ellipse with the correct major and minor axis (three marks). Accuracy and the correct position of the ellipse on the insert scored (one mark) each. Where candidates have used a trammel to construct the ellipse, this should be drawn or fixed to the examination paper. Without this evidence the full (5) marks could not be awarded to the candidate.

Most candidates managed to draw the square and two circles accurately. The regular hexagon and octagon proved to be more challenging for many candidates. Many candidates ignored the required minimum 8 mm spacing and marks were lost accordingly.

Candidates who drew the ellipse in the middle and the larger polygons in the four corners with an 8 mm spacing to the edge scored the highest marks. The triangle, diamond and small circle could then be accommodated in the space available above and below the ellipse.

Question 4

Three concrete pots

This question was attempted by a small number of candidates. For those candidates who attempted this question, a wide range of marks was gained by their answers.

(a) Many candidates scored full marks for Hexagonal Prism and Cylinder.

(b) Most candidates added to the existing plan view, two further pots (one mark) and drew the cylindrical pot correctly to size (three marks). Some candidates failed to draw the hexagonal pot as a regular shape. The positioning of the circular pot so that it touched the square and the hexagon proved challenging for some candidates. Practice at 'circles touching' would have been beneficial to these candidates.

(c) A freehand pictorial sketch in good proportion was not achieved by many candidates who attempted this question. Candidates should have taken sizes from their response in **(b)** and 'crated' the hexagonal prism and cylinder to get their respective sizes in proportion to the square prism pot. The respective 'footprint' of each pot should be drawn pictorially first to provide a starting point that would prevent any of the pots from 'floating'. Many failed to draw the pot A at the front.

Paper 0445/03

Realisation

General comments

Many candidates failed to achieve maximum marks for questions because their answers lacked detail, clarity or accuracy. Sometimes candidates gave lots of information that was irrelevant to the question being asked.

Many questions have large mark allocations, i.e. six marks or more, where candidates are required to use notes and sketches to show how a variety of processes or constructions may be carried out. It is essential that candidates understand that to gain maximum marks for these types of questions they must provide good quality, clear sketches supported by notes that are both detailed and technically accurate. There is a direct relationship between the number of marks available and the depth and detail of answer required.

Comments on specific questions

Question 1

(a) Many candidates were able to list the tools required to make the sides of the trolley. The b answers included clear sketches relating to how the tools would be used and the method o construction. Some answers included excellent details such as the use of pilot holes and countersunk head screws.

(b) Candidates needed to show two sides located along the length and across the width of the base of the trolley with the battens slotted inside the brackets. Only a minority of candidates were able to show these details.

(c) There were many innovative answers to prevent the corners of the trolley from being forced apart. The most common design included the use of right-angled metal brackets that could be screwed to the sides of the trolley. For maximum marks candidates were required to name a suitable material for the fitting and describe how it could be secured to the side of the trolley. These details were not always given. Some designs were located across the top of the trolley and while these would prevent the corners from being forced apart, they would also have interfered with the operation of the trolley.

(d) The vast majority of candidates gained maximum marks for successfully completing most of the materials list.

Question 2

(a)(i) Most candidates named a suitable material for the bracket; mild steel and aluminium being the most popular. Many candidates named appropriate marking out and cutting tools with scriber, rule, try square and hacksaw being the most common correct answers and there were many clear sketches to accompany these tools.

(ii) There were many good answers showing a clear understanding of the preparation undertaken before drilling and the safety precautions required.

(iii) Candidates appeared less sure of the correct procedures to bend the metal to shape. Many included the use of a vice or anvil and a hammer but did not realise the need for heat to soften the metal or the use of folding bars or a former.

(b) The vast majority of candidates attached the bracket to the trolley base by means of screws. This method would have only limited success as the screws would work loose over time. A better method was to use nuts and bolts with washers.

(c) Many candidates showed an appropriate method of retaining the wheels onto the axles using nuts onto a threaded bar. There were fewer correct answers showing the use of washers or ‘spacers’ to prevent the wheel from rubbing against the bracket in use.

Question 3

(a)(i) Only a minority of candidates understood that masking tape would be used to prevent the drill from slipping.

(ii) The reason for clamping the material when drilling is to prevent the drill bit from snagging in the hole being drilled causing the plastic to spin and possibly crack or cause injury.

(iii) The vast majority of candidates understood that soft jaws would prevent the plastic from being scratched or damaged.

(b) Many candidates were able to give sensible safety precautions when using solvents, including good ventilation, the use of gloves or mask. Fewer candidates were sure about how the solvent would be applied or how it worked.

(c) For maximum marks candidates needed to refer to the edges being scraped or draw filed, made smooth by means of wet or dry paper and finished on a polishing mop with polishing compound.

(d)(i)-(iii) The majority of candidates understood the difference between thermoplastic and thermosetting plastics. Unfortunately, some candidates had the correct answer but applied it to the wrong type of plastics. Candidates were less accurate when asked to name examples of thermoplastics and thermosetting plastics.

(e) The most popular features referred to included the finger slot at the front of the holder and the fact that the holder was made in two pieces enabling one part to be lifted giving access to the notepaper.

(f) To form the plastic to produce the holder candidates needed to provide detailed information including: the method of heating the plastic using an oven, strip heater or line bender; the use of jigs or formers and the method of retention while the plastic cools. In addition to this, communication techniques needed to be accurate and detailed to achieve the maximum nine marks available. While many candidates demonstrated reasonably good understanding of the basic bending techniques, few were able to access maximum marks.

Question 4

(a) The best reasons for using sheet metal for the air vent included its ability to be cut and formed easily and that it could be made from a single piece of material.

(b) Candidates needed to focus on "…how part **B** could be formed from *one* piece of sheet metal". There are two aspects that candidates needed to address in order to achieve maximum marks: a one-piece net from which the vent could be made and how the net could be formed into shape. Many candidates gave details of one of these aspects, not both, and subsequently failed to achieve the eight marks available.

(c) The vast majority of candidates were able to name and sketch appropriate marking out tools. Some candidates did not achieve maximum marks due to naming a tool that was inappropriate, (sometimes a tool that was not connected to marking out), or due to poor quality sketching.

(d)(i) Tin snips and/or bench shears could be used to cut thin sheet metal. Hacksaws are inappropriate when making long cuts in sheet metal. Candidates needed to show how the metal would be held and provide notes describing how the shape would be cut accurately and safely.

(ii) Most candidates thought that the best way to make the edges of the metal safe was by filing. This would have only limited success. Better answers referred to at least a folded edge and the best answers to a wired edge.

(iii) To bend one corner of the metal would need a vice, use of folding bars or former with the force applied by means of a soft faced hammer or mallet. Many candidates did not make any reference to the use of a hammer and some bent the metal by simply pushing it over by hand.

(iv) The final joint could be made by the use of pop rivets or the use of an epoxy resin adhesive. The majority of candidates chose the rivets with many who chose an adhesive naming an inappropriate type. There were many instances where candidates achieved maximum marks for showing the edge of the metal drilled ready to accept the rivets and a sketch of the pop rivet and/or rivet gun. However, there were numerous answers given that included the use of heat such as soldering or brazing which were unacceptable.

Paper 0445/04

Technology

General comments

Good responses were characterised by the use of correct and 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, also, a hallmark 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. An area of very good practice was in electronics where there was clear evidence of good teaching, preparation and practical application of knowledge.

Comments on specific questions

Question 1

This was the most popular question selected by candidates and was accessible to a full range of candidates who in general showed a good grasp of the syllabus topics examined here.

(a)(i) Most candidates were able to identify potential energy and kinetic energy as the energy conversion taking place.

(ii) Fewer candidates were able to identify fully the main reasons for energy losses, i.e. friction (which most candidates identified) and lack of control of the ball travel.

(iii) Most candidates were able to identify methods of reducing friction though not all responses fell within the mark scheme.

(iv) There were some good responses to this question clearly showing a good design approach and understanding of the needs of the problem. These were addressed and well represented by good use of annotated sketches.

(b)(i) Most candidates were able to identify the pivot, load and effort though there was some confusion as to the effort and load in some candidates responses.

(ii) Many candidates were able to describe the principle of moments in terms of force and distance.

(iii) Few candidates were able to demonstrate knowledge of prototype modelling *using resistant materials*. Many described the use of CAD to simulate but this was not asked for in the question.

(c)(i) There were many good responses to this element showing a good understanding of the use of gussets or braces to make the upright more rigid.

(ii) Though most candidates knew the dial gauge few could appropriately position the device for the test needed in this instance.

(iii) Many candidates were able to identify the use of a strain gauge for this purpose.

(d)(i) Though many candidates showed good scientific knowledge of how a solenoid works in terms of electromagnetism specific technological application was less evident.

(ii) The vast majority of candidates were able to identify the LDR.

(iii) Though many candidates knew the diode was there to protect components few identified that it was protecting the transistor.

Question 2

A popular choice – this question examined the mechanisms and control elements of the syllabus loc range of practical applications as well as analysis of existing products using mechanisms. There range of responses from candidates showing good accessibility for the candidature.

(a)(i) This element was poorly answered with few candidates able to offer a suitable mechanism in the form of a 'Y' linkage. Many candidates offered a cam or other mechanism which was outside of the parameters of the question and mark scheme.

(ii) Many candidates were able to list rotary, linear and oscillating motion.

(iii) Most candidates were able to state the use of CAD systems but few indicated the use of construction kits for modelling this system.

(b)(i) Most candidates were able to identify the cam.

(ii) There were many good responses to this element showing a good understanding of the operation of cams in this type of situation.

(iii) Nearly all candidates identified the pulley wheel.

(iv) Most candidates were able to identify the worm gear.

(v) Fewer candidates were able to give a benefit for using the worm gear as being quiet or suffering from less slip.

(c)(i) There were a few good responses to this element showing a good understanding for the need for flexibility in couplings. Most solutions were for the use of a rubber tube or sleeve though a few linkage systems were given.

(ii) Only a small number of candidates were able to sketch a diagram of a universal joint but those responses were well drawn and clearly demonstrated a good understanding.

(iii) This was a weak element for many candidates. Few were able to sketch a journal bearing and few were able to identify the use of a roller bearing for heavy radial loads.

(iv) Many candidates were able to identify the need for lubrication of shafts citing friction, wear and heat reduction as reasons for lubrication.

Question 3

This was the least popular choice of question. Though of the candidates who did attempt it there were some good responses showing clear understanding of structures knowledge though all candidates struggled with the graphical solution to the framework question.

(a) Generally well answered showing good understanding and application of knowledge.

(b)(i) Very few candidates were able to explain the effect of dynamic loading on a structure and from the responses there appeared to be much confusion as to what constitutes a dynamic load.

(ii) Most candidates were able to identify the benefit of ease and speedy construction in using modelling straws. Fewer noted the drawback that these straws tend to buckle or fold too easily.

(iii) This was the weakest element of this part of the question with some inappropriate responses such as "welding" being offered. Few candidates had experienced use of straws and did not know of methods such as lashing with cotton or slitting and insertion prior to gluing.

(c)(i) A small number of candidates were able to draw an accurate shear force diagram for the cantilever shelf.

(ii) Similarly the response to this element was very weak.

(d)(i) Most candidates were able to determine the reactions at either end of the truss.

(ii) No candidate was able to fully determine the values and nature of the force acting in the roof truss by graphical methods or by calculation (not asked for in the element).

Question 4

A popular choice and some responses indicated a high level of understanding of electronics. Thi points to a high level of project experience.

(a)(i) Many candidates were able to show that a parallel connection of switches would be the appropriate connection for this situation.

(ii) Many candidates were able to show that a series connection of switches would be appropriate for this situation.

(iii) Fewer candidates were able to identify a toggle or slider switch for this element.

(b)(i) There were many good responses that showed the relationship between R_1 and C_1 as being the determining factor for time period.

(ii) Good understanding of a transistor as a switch was shown by the majority of candidates who had good knowledge of the operation of the transistor and the way in which a small base voltage can control a larger collector emitter current flow thus enabling the bulb to light.

(iii) Many candidates knew the differences between the two capacitors and how this affected their applications.

(c)(i) A large number of candidates were able to show a good understanding of the LED and its construction and connection in circuits.

(ii) Many candidates were able to show that a protective resistor is needed to control the voltage across the LED.

(d) A large number of candidates demonstrated a clear understanding of the potential divider and were able to perform the calculation of R_1 and R_2 accurately.

Paper 0445/05

Coursework

General comments

The Moderator would like to thank those Centres that submitted the moderation sample in line with CIE's requirements. In the majority of cases work was well presented and the Coursework Assessment Summary form and Moderator copy of MS1 were included as required. There were a few cases where the sample submitted did not cover the full range of marks awarded by the Centre and this makes moderation very difficult to complete. There were also a few cases of arithmetic and transcription errors, resulting in an incorrect mark being awarded to those candidates concerned. The Moderator was able to correct these errors but Centres are reminded of the requirement to have all additions and transcriptions checked by a second person.

Unfortunately some Centres are allowing their candidates to produce design folders written in the past tense and as such these are really only reports of what has already taken place. It is imperative that folders are based on evidence that a design process has been followed. If this is not done then marks cannot be awarded against some of the assessment criteria in the syllabus.

Projects covered a wide range of topics, many of which had genuinely evolved from candidates' own interests and involvement in school and family life. Interesting outcomes included: wheel clamp; bird cage; book support for reading in bed; musical instruments; cutlery drier; white board; several forms of lighting; camera support; baby feeding tray; gate security stop; foot rest; saddle rack; boat launcher; car cycle rack; pet information package and formal clothing.

Comments on specific assessment headings

Analysis of problem and design brief

As the starting point for most design processes, it is important that candidates complete this section correctly. Most were able to state the problem clearly and this was usually followed by a clear design brief but many candidates failed to analyse and research fully the actual *problem*. In this section candidates are required to identify the aspects of the design problem that need to be considered and subsequently researched.

All too often candidates included several pages of information on materials, constructions, finishes and fittings, this before any ideas or concepts have been put forward. This really is a waste of time and marks cannot be awarded under this section of the assessment. These issues should be considered as part of the development of the final idea.

Specification

Few candidates were unable to identify sensible specification points in the form of a list but these were often generic in nature or started to identify materials and such as solutions to the problem. If the list of specification points is completed with care then it becomes the natural tool for use at the evaluation stage after the product has been completed.

Many candidates take on projects that result in a model as the outcome. This is fine but, unfortunately, they do not always make this clear in the specification. Where a model is to be produced then the reason for this or the use to which the model will be put must be stated clearly so that meaningful evaluation can be carried out.

Exploration of ideas

In many ways this is the most important and interesting part of the design folder and, as such, it is awarded the highest number of marks in the assessment scheme. This is the opportunity for candidates to be really creative and to record any ideas that come to mind however feasible they may seem at this stage. Some candidates become stifled by adopting a too formal drawing style and do not allow their ideas to flow. Others adopt a very flexible approach and add annotation to their drawings as thoughts come to mind so that they can be creative in the true sense of the word.

Many candidates should be congratulated on the variety of design ideas put forward and on the high quality of graphic techniques used to communicate these ideas. It is important that candidates display a wide range of different ideas rather than concentrate on variations of one or two themes.

Development of proposed solution

This is the point at which candidates should consider and make reasoned decisions about the form, materials, construction and finish of the proposed solution to their design problem. There should be evidence that alternative approaches have been considered in all these areas if high marks are to be gained. These decisions should then be followed by the production of working drawings that give all the required information for the manufacture of the final product in the school workshop.

Where a model is to be produced then this section should focus on the form, materials, construction and finish for the model depending on its purpose. Candidates sometimes consider the full size article when they know that a model is to be made although there may be cases when the best modelling material to represent certain real materials needs to be considered.

Planning for production

Successful candidates considered how they were to go about making the solution before any work commenced and then produced some form of planning chart outlining the significant stages of manufacture. Unfortunately this was one area where candidates often produced the content after making had been completed and as such was simply a record of what had already taken place. Marks cannot be awarded for this approach.

There is no requirement for candidates to give detailed descriptions of basic procedures but they are advised to give some consideration of complex tasks or those that are new to them.

Quality of production

It was clear that many candidates had gained considerable experience from and were very proud of the product they had made. Some design solutions were of a very high standard indeed and would clearly perform the required function for a considerable period of time. It is reassuring to see candidates achieving success in this way and to gain so much satisfaction from their hard work.

Centres are reminded of the CIE's assessment requirement to include clear photographic evidence of made products. These should include an overall view of the article together with appropriate evidence of detail to support the mark awarded. Unfortunately, some Centres are failing to do this as required.

Evaluation

It would be fair to acknowledge that evaluations are improving in quality and becoming more meaningful. This is particularly the case where candidates have gone to the trouble of arranging appropriate testing of the product and then linked the outcome to their original design specification for the solution. It is not sufficient to produce a simple list of tick boxes against each specification point as candidates need to qualify how and why the point has been met.

Unfortunately some candidates focus the evaluation on how well the *project* has progressed and omit to consider and test the *product* in its intended environment. This approach can be awarded very few marks.

Fitness for purpose

Most candidates seem to be awarded fairly high marks for this section of the assessment and it is very difficult for the Moderator to make meaningful judgement as the product is not to hand. However, it is important for internal markers to be fair to all and to discriminate between candidates in a meaningful way.