CONTENTS

DESIGN AND TECHNOLOGY

Paper 0445/01
Common Core

General comments

Candidates appeared able to access all questions on the paper with an encouraging level of success. ***Part A*** was designed to test candidates' knowledge of the Common Core content and many showed that they were well prepared in this area, scoring high marks.

As usual, there was a wide range of responses to ***Part B*** questions and many candidates should be congratulated on the wide range of design ideas presented, the depth of information included for the final solution and the clear communication skills used. In these cases the Examiner was able to follow clearly candidates' responses. All candidates are encouraged to set out their response to the ***Part B*** question in line with the sections of the question, as asked, as this helps the Examiner to follow their thought process.

There were very few rubric errors and candidates handed in their answers to the two Parts of the paper as instructed on the front of the question paper. The Examiner would like to thank Centres for their assistance in this respect and for despatching scripts in the correct numerical order.

Comments on specific questions

Part A

Question 1

Most candidates were able to indicate the direction of light by drawing the shadow in the correct places and shading the vase in an appropriate way. For maximum marks the Examiner expected to see the two parts of the shadow, on the table and the wall, lining up in the corner.

Question 2

(a) Candidates were able to identify two dangerous parts on the children's wheelbarrow, the common ones being the sharpness of the top edge and the axle sticking out at the front. The other obvious danger was the lack of grips on the handles.

(b) Solutions to these dangers were generally sketched and described successfully. However, some candidates simply said 'round off the sharp edges' for example, and this was not sufficient for the award of full marks.

Question 3

Many candidates gained full marks on this question although some did not make it clear that the try square was for marking or testing right angles. They simply said: 'for drawing/marking lines, which was insufficient for the one mark awarded to each part of the question.

Question 4

(a) Candidates' knowledge of renewable energy sources was generally good, indicating that this part of the Common Core is covered well in Centres. The Examiner was prepared to award marks to any of the accepted forms, including crops intended for this purpose.

(b) Again, knowledge of non-renewable sources was also well displayed, the common ones being oil, gas and coal. If candidates used the term: 'fossil fuels' for one of their answers then this was awarded one mark if it was the only reference to any type of fossil fuel but no marks if the candidate then went on to give a specific fossil fuel for the second example.

Question 5

(a) Candidates were sometimes confused over permanent and temporary joining methods and were not always sufficiently specific for the award of maximum marks. The Examiner was looking for knowledge of adhesives or specific 'welding' methods for acrylic and brazing or welding for the steel tube.

(b) Nails, screws, bolts and KD fittings can be used for the temporary joining of softwood. Brass sheet can be joined by the use of a range of combinations of different types of screw, bolt and nut.

Question 6

(a) The majority of candidates were able to identify a guy rope or part of the fabric sides as being in tension but not as many labelled the tent pole as a part in compression.

(b) Very few candidates indeed were able to complete the two sentences correctly by adding tie for the part in tension and strut for that in compression. This was disappointing for the Examiner.

Question 7

(a)(b) Most candidates were aware of the safety equipment required for the two pieces of equipment stated. Many gave a pair of goggles for the drilling machine and a face mask for the sanding machine. The Examiner was not prepared to accept the same piece of equipment for both applications.

Question 8

Candidates were generally familiar with standard block diagram configuration and most answered correctly.

Question 9

(a) Many candidates suggested correctly lathe turning or casting for the lamp base.

(b) Most candidates were aware that vacuum forming or injection moulding would be appropriate production methods for the thin seed tray.

(c) Unfortunately, fewer had knowledge of laminating or steam bending for the forming of the curved chair frame.

Question 10

(a) The Examiner was pleased to see that candidates had a good understanding of the use of modelling and mock-ups in the design process, stating that these were used to test, in a range of ways and for a variety of reasons, that ideas would work.

(b) Most candidates were able to identify two ways of producing models, including: kits; cardboard; paper; balsa wood and various computer applications.

Part B

Question11

This was the most popular question and candidates produced a range of ideas for the storage of gardening tools. Many were based on a developed form of box construction and some candidates included their own requirements such as the need for a mobile system or space for the storage of other equipment. Unfortunately, candidates often ignored the likely size of the tools to be accommodated as they developed design ideas.

(a) Candidates had little difficulty listing four points about the function of the storage system including: ease of use; security; weather resistant; tools held in place; correct size for children etc.

(b) Points about appearance ranged from: being of interest to children and matching the school to blending in with the garden environment. Specification points must not be a series of questions but actual requirements linked to the intended use of the article.

(c) It was pleasing to see that more candidates than in past examinations were adding meaningful notes about the function of 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. There is a temptation for candidates to present many simplistic drawings or variations on a single theme. 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) Good evaluations were often in list or bullet point form and referred to the requirements of the design problem and specification points made earlier in the question. Unfortunately, evaluations were often somewhat subjective in nature. Candidates are reminded of the need to give reasons for the choice of ideas for development. Candidates either evaluated ideas alongside drawings as they were produced or produced a separate section after the ideas stage. This year candidates from several Centres produced a table which awarded points as to how well each design idea matched the specification points listed in parts **(a)** and **(b)**. 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 all constructions. Any appropriate projection method or combination of methods can be used. Unfortunately, candidates often simply repeated drawings and ideas from the previous section adding little of the required detail. This section of the question carries the highest proportion of marks and as such should be given an appropriate amount of time.

(f) Candidates often gave generic terms such as wood, metal and plastic which are unacceptable in the selection of materials. Specific materials must be identified with reasons for choice which link to the developed design idea. Unfortunately, candidates' responses were often of no relevance to the final product. Good responses to this part of the question were often in tabular form.

(g) Very often candidates were not specific about the part of the product being made and often attempted to produce the whole article in a vague way. Good responses tended to focus on just one, often small, part of the solution, as suggested in the question. Successful candidates made it obvious that they were familiar with a wide range of production methods, materials and equipment.

Question 12

This was the second most popular question and intended for those candidates who had followed the graphics option. Some ideas were very imaginative indeed and showed just how wide the requirements could be interpreted and the variety of materials that could be used. Many candidates were clearly very interested in this design problem and the Examiner had the impression that they felt genuine ownership of their ideas.

(a) Candidates identified a whole range of functional requirements covering: ease of access; weather resistance; comfortable to carry; lightweight; protect contents; hold paper without folding etc.

(b) Requirements for the appearance of the carrier ranged from those that were linked to the subject or the school uniform to those linked to style, colour and current fashion trends.

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

(g) The Examiner was pleased to see a wide range of imaginative ideas for a logo representing Design and Technology. Candidates were not always very specific as to how the logo would be attached to the carrier and often responded with such answers as: 'glued on' without due consideration of the material on which it would be attached.

Question 13

This question was intended for those candidates following the Technology option but was the least popular and answered by a very small number indeed. However, candidates who did attempt this question often produced some very imaginative ideas for a device to scare off birds but did not always follow these through to detailed and practical methods of construction. It was often unclear how the device would be powered.

(a) Candidates successfully identified points about the function of the device including: weather resistance; firm fixing; low maintenance; portability; not harmful to birds etc.

(b) Most candidates were able to identify four power sources for remote areas including: battery; clockwork; wind; solar; water and small generators.

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

Question 14

Some candidates obviously found the idea of designing football goalposts appealing but it attracted only a few more than **Question 13**. As might be expected, most ideas were developed around a tubular structure and candidates seemed familiar with the problems that might need to be resolved.

(a) Candidates were able to identify functional requirements of the goalposts such as: weather resistance; stability in use; low maintenance; easy to carry/lightweight etc.

(b) Candidates are usually familiar with or able to identify safety requirement and this question proved no exception including: no injury to players; cannot trap fingers; not too heavy; secured to the ground; cannot collapse etc.

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

Paper 0445/02
Communication

General comments

The standard of work was comparable to that of the previous year. **Questions 1** and **3** 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, geometrical constructions and the correct method for showing sections and correct views in orthographic projection. The application of shading on sketches to give a 3-D effect is also an area for improvement.

Comments on specific questions

Question 1

Car

This was by far the most popular question. Candidates gained a very wide range of marks for their answers.

(a) One mark was given for the correct width, one mark for the height of the wheel, one mark for the correct angle, one mark for the semicircular end and one mark for the correct positioning of the wheel. Most candidates scored more than half marks. Few candidates copied the angle from the other wheel. Many candidates did not use the existing wheel to get the correct height by projection.

(b) The sketch showed a regular semi-octagon. From this and the leader lines on the main drawing, candidates are given the distance across flats of a regular octagon. Few candidates used the correct construction with some managing to draw a semi-octagon from other reference points. One mark was awarded for the correct length of side, one mark for a semi-octagon and three marks for the correct construction.

(c) Many candidates drew an ellipse in the correct orientation (1 mark). However, a large number of candidates erased their construction lines making the three marks for construction difficult to award. Where candidates had used a 'paper trammel' this was sensibly attached to the examination paper as evidence of construction. One mark was awarded for line quality.

(d) Few candidates constructed this correctly for three marks. Of those who did, most of the construction lines were erased, making the awarding of marks difficult. A large number had used a drawing aid (radius curve) to draw the arc. If this was accurate and to the two connecting points, one mark was allowed.

(e) A large number of candidates were awarded one mark each for style, size and three suitable letters on this part of the question. The use of guidelines and spacing (2 marks) and the accuracy of the drawing (2 marks) were the main discriminators.

(f) For the full three marks, suitable colouring of even texture and accurate application was required.

Question 2

Tensioner

This was the least popular question on the paper. Of those who attempted it, many failed to get the views in the correct position and consistent with the projection symbol they chose (3 marks **(a)(i)**). Responses in both 1st and 3rd angle projection were made by candidates. Both systems were accepted and awarded marks.

Many candidates failed to assemble the two parts correctly. Some candidates drew only the body without the reel.

Whilst the order of the question in **(a)** asked for the sectional front elevation in part **(i)**, candidates would have achieved a higher number of marks had they drawn the plan first – part **(ii)**. The other two views would then have been more accurate by projection.

(a)(i) Many candidates drew the lug with its hole (1 mark). The cut-away (1 mark), was not accurately drawn by many candidates. Few candidates managed to draw the wall thickness correctly with the Ø12 hole in position (3 marks).

The drawing of the sectioned Ø25 reel inside the Ø26 hole, was not achieved by many candidates (3 marks).

(ii) The body height and width was drawn correctly by many candidates (2 marks). The cut-away and Ø25 of the reel (2 marks) were not correctly drawn by many candidates. Few candidates drew the wall thickness correctly (1 mark) or the lug thickness (1 mark).

(iii) Many candidates drew the square body (1 mark) without any radius on the corners (1 mark). The wall thickness was not always consistent around the whole body (1 mark). Few candidates included the reel in this view (3 marks). Most candidates who drew the □10 spigot failed to draw the diagonals to identify it as being square and not a round shaft (1 mark).

(b) Many candidates drew a projection symbol (1 mark), but few managed to get the symbol consistent with the projection they had used (1 mark).

Question 3

Rocket toothbrush box

This was the second most popular question. Candidates gained a very wide range of marks for their answers.

(a) Most candidates sketched two ideas for the trademark representing the name ROCKET. The quality of sketching (2 marks) was variable as was the relevance of some idea sketches (2 marks).

(b) Most candidates managed to draw the remaining sides of the development correctly (5 marks) with a viable one-piece development (2 marks) having the join in the correct place (1 mark). (Some candidates drew all the sides separately and accurately- up to five marks allowed). The window caused many candidates a problem and marks were awarded for position, width and height (3 marks). Glue and tuck-in flaps varied in size (2 marks) and relevant number (5marks).

(c) The accuracy of the transfer of the chosen design (2 marks), to the correct position on the correct face (2 marks) of the box was not achieved by all candidates who attempted this part of the question.

(d) Most candidates scored marks for the effective use of colour

Question 4

Torch

Whilst the product used for this exploded isometric question is very common, several candidates failed to assemble the parts in the correct order (3 marks). The question asked for a half full size pictorial sketch (1 mark) and responses in any orientation in the space given were awarded marks.

Two marks each were awarded for drawing the battery, bulb and bulb holder. Not all candidates managed to get these in the correct order. The reflector was awarded 4 marks. One mark each for the 20mm thickness, the rounded off square section, the circular reflector and the hole for the bulb.

The alignment of the exploded drawing (3 marks) was achieved by the majority of candidates. (A formal isometric line drawn by the candidate to achieve this alignment is acceptable). The quality of the sketching varied from excellent to very poor (3 marks).

Most candidates managed to draw the shape for the taper and the left hand end of the torch casing correctly (4 marks). Whilst most candidates drew the switch accurately and in the correct position (1 Mark), the Ø34 and Ø38 circles on the casing (2 marks) caused problems to most candidates. Few candidates managed to draw the two lugs **L** correctly (1 mark for one drawn correctly).

Paper 0445/03
Realisation

General comments

Generally the candidates seemed to be well versed in the theory of materials and their use, especially as far as wood products are concerned. The popularity of the questions making use of wood is evident by the large number who chose to attempt them, and there were some extremely well answered papers. The question regarding metal was only well answered by a small number. Use of metal does not seem to be popular and is mostly weak. Knowledge of plastics when using vacuum forming and strip heaters was usually the area where candidates were able to make a fair contribution.

The content of sketches verses notes was not as good as seen previously. There were too many examples of continuous notes with few simple sketches, which can give a much clearer understanding of the information shown. However, there were some good responses and many clear logically presented answers were seen.

Comments on specific questions

Question 1

This was possibly the most popular question and candidates were able to show a clear understanding of tools and practical skills; good clear sketches were lacking in many cases.

(a) Design criteria proved to be confusing for many candidates.

(b) Choice of materials usually meant use of wood, though reasons for choice were often negative, and the most suitable material would have been plastic.

(c) Technical details proved to be quite good but many candidates were unable to sketch clearly and the tendency was to write far too much when a clear sketch would have been more effective.

(d) The sequence of production from material to completion of product was very well done.

(e) Use of diagonals to ensure a frame is square proved to be quite good.

(f) Knowledge of hinges was well explained.

(g) Organisation within the container brought some good ideas.

Question 2

This was not a popular question. There were few good results, due to poor use of short notes and clear simple sketches, and a lack of knowledge.

(a) Knowledge of laminating was found to be very weak.

(b) Marking out the material and a clear understanding of development was well done. Cutting and forming the shape together with finishing often lacked clarity.

(c) Use of tools for marking out was good, but tools used for cutting joints were not so well known.

(d) Sequence of assembly was generally poor due to lack of skills when sketching.

Question 3

This was a very popular question. Knowledge of construction formed an important part of this question, and many candidates were able to attempt this with success.

(a) Candidates failed to identify the value and advantage of using plywood, but gave some excellent answers for hardwood use.

(b) Fixing and use of castors was well done, as was the selection of joints when using wood.

(c) Many good ideas of design improvements were found in this part.

(d) Knowledge of the use of patterns when forming plastic using heat was a necessary part of this question.

Question 4

Practical application of sheet metal tended to be weak.

(a) Few candidates were successful when selecting suitable sheet metal for this question.

(b) Little knowledge was shown of cutting, bending and joining sheet metal.

(c) Methods of finishing were not often shown.

Paper 0445/04
Technology

General comments

The overall performance of candidates was comparable to that of the previous year. It was clear where candidates were able to draw upon their practical experiences in supporting their responses that benefited from hands on learning. Good responses were typified by the use of specific technological vocabulary and by the effective and appropriate use of annotated sketches. There was also clear evidence of good knowledge and understanding stemming from thorough preparation and broad coverage of the syllabus by many Centres.

Comments on specific questions

Question 1

This was a popular question that drew on the broader knowledge and understanding of the syllabus.

(a)(i) Most candidates identified the first two energy states but few identified the third energy state in the water pump as being: 'mechanical'.

(ii) Most responses focused on economic reasons, fewer saw the benefit of having no mains cabling in a remote location.

(iii) Many saw that the variability of wind energy would create operational difficulty.

(iv) The majority of candidates were able to identify the battery as a 'secondary' source.

(v) Most good responses advocated the enlargement or modification of the blade profile or angle of attack.

(b)(i) Most candidates were able to show how the pole could be braced using either struts or ties.

(ii) This part was in the main strongly answered with many candidates suggesting the use of strain gauges or DTI.

(iii) Generally candidates who had identified the correct device were able to draw it accurately. Some sketches of strain gauges were of a very high standard and demonstrated a very good knowledge and understanding of the operation of the strain gauge.

(iv) Most candidates were able to show the relationship between force and the distance it acted from a given point on an object.

(c)(i) Many candidates were able to complete the circuit diagram correctly. A few weaker responses relied too heavily on the random use of the given circuit symbols in incorrect positions. Candidates with hands on experience of these components were able to excel in this part.

(ii) Again practical experience was evident in correct responses stating how the use of a heat sink aided the soldering of a transistor.

(iii) Good knowledge and understanding of both real and virtual bread-boarding methods was evident in many responses.

(iv) Again many candidates were able to explain the benefits of mocking up circuits in terms of testing and developing circuits and checking circuits before going into production.

Question 2

This was a reasonably popular choice that focused on structures elements of the syllabus.

(a)(i) Most candidates could identify the members in tension and compression.

(ii) Most candidates used trigonometry to determine the values of the forces and many were able to calculate correctly the values. Fewer used graphical methods.

(iii) Most candidates recognised that redundant members carried no force and if removed would have little detrimental effect on the structure.

(iv) Few candidates were able to identify the benefits to the manufacturer in terms of labour saving. Candidates generally relied on one word responses “strong”, “cheap” and missed the benefits of reliability, durability and no assembly needed by consumers.

(v) The use of gussets to increase rigidity was well understood and explained by most candidates.

(b) There was less widespread knowledge and understanding of the importance of section of structural members and this was evidenced by weak responses that missed the point of this part. Few candidates could draw a sectional view correctly.

(c)(i) Though there were some good responses to this part few candidates were able to access fully the whole range of marks available. This was often typified by random application of key features and weak curve drawing. There was some confusion over elastic and plastic behaviour areas too.

(ii) Most candidates were able to perform the calculation but there were many errors in units and decimal point. There was also in a significant number of responses confusion over the calculation of circle area which gave incorrect answers.

(iii) Few candidates were able to perform the transposition of formulae to determine the strain. Again there were errors of decimal order and units. (Those candidates with incorrect responses to the first part were not penalised for using incorrect stress values in this part.)

Question 3

This question explored the mechanisms elements from the specification. It was a popular choice and reflected candidate’s wider technological knowledge from everyday life where they were able to support responses with appropriate examples.

(a)(i) The majority of candidates could accurately label the features on the diagram.

(ii) Many candidates could identify the barrow as a second order lever.

(iii) Most candidates could determine the Velocity Ratio accurately though some candidates were confused and lost marks by getting the VR to be 1 / 3 instead of 1:3.

(iv) Most candidates identified that lengthening the handle would improve the effectiveness of the barrow.

(v) Most candidates could give an appropriate example of the use of leverage in a garden tool.

(b) Though many candidates could draw a labelled diagram of an eccentric cam few could design a water drip feed control system based on a cam/follower. This may suggest that many were showing knowledge through rote learning rather than through experience of using cams in control.

(c) Here candidates were less able to nominate a suitable material but were able to give reasons in the form of properties that the cam needed, e.g. resists corrosion, durable, waterproof.

(d)(i) Many candidates were able to identify the worm gear and worm wheel though there were some candidates who were clearly confused.

(ii) Many candidates were able to state two appropriate benefits of using this system, e.g. high ratio, compact, accurate, transmission through 90°.

(iii) Most candidates were able to calculate the output speed, though one or two performed a multiplication instead of a division so that the output was increased. This implies some confusion in terms of the application of a worm gear system in this situation.

(iv) Though many candidates identified the input as “rotational” fewer were able to identify the output as “reciprocating” despite the annotation given on Fig. 7.

(e) Though most candidates knew that a clutch is used to control the motion of the lawnmower fewer stated that the motor is allowed to continue to rotate and that the clutch controls the motion of the output shaft.

Question 4

Fewer candidates attempted this question and it was clear that the majority of those that did attempt it had good experience of working with electronics and were well prepared in this aspect of the specification.

(a)(i) Few candidates were able to show the connection of a feedback resistor across the IC.

(ii) Many candidates were able to show that the VR is used to adjust the sensitivity of the circuit.

(iii) There were few candidates who could explain the use of a potential divider to bias the IC.

(iv) Few responses showed understanding of the relationship between the VR and the Thermister and that by swapping them over in the circuit would have the required effect of triggering the circuit at high temperatures.

(v) Most candidates recognised that the IC would make the building of the circuit easier and less costly due to the reduction in the number of discrete components needed and the reduction in soldering operations.

(vi) Most candidates knew that a chip socket would reduce the problem of heat damage when soldering the IC into the circuit.

(b)(i) Candidates’ understanding of the code for resistors was generally very good.

(ii) Generally candidates were able to explain the tolerance factor in resistor manufacture and how this was important to the design of circuits.

(iii) Most candidates were able to differentiate between series and parallel connections.

(iv) Most candidates could calculate the value of the total resistance for the example given. Some candidates made errors in substitution and arithmetic.

(c)(i) Few candidates could fully explain the effect of latching in a circuit.

(ii) Most candidates could successfully complete the circuit diagram showing a sound understanding of the use of a relay to control a secondary circuit.

(iii) Many candidates could state that the VR is the device used to control sensitivity.

(iv) Few candidates could fully explain the concept of electromagnetism but it was evident that most had some understanding.

(d)(i) Most candidates could complete the table showing good understanding of the basic building blocks of circuit design.

(ii) Most candidates were able to specify a suitable and appropriate alternative output device for the circuit.

Paper 0445/05

Design and Technology

General comments

Candidates produced a wide range of coursework projects and it was pleasing to see that, in most cases, the outcomes solved a real problem raised by the candidate concerned. In addition to the usual range of toys, household items and furniture, interesting outcomes included: bird feeder, nesting box, outside shower unit, chemical/drug safe storage, camping bed, sundial, saddle rack, radio, internet kiosk, museum pack, children's play area and other community projects.

Candidates were rarely stifled by poor problem selection but in cases where familiar problems were chosen, outcomes often showed little evidence of imaginative interpretation. It is important that Centres guide candidates in this respect so that they can take full advantage of the potential range of opportunities presented by the initial problem.

The sample of work presented for moderation was suitable in most cases and Centres had generally applied the assessment criteria appropriately although, in some cases, not at the correct level. Centres new to this syllabus are advised to refer to the exemplar coursework material contained in the Distance Training Pack, obtainable from CIE, if they have not already done so.

Centres are reminded of the need to select the moderation sample in line with the guidance given by CIE. The sample should cover the full range of candidate's marks and include the highest and lowest marks. All folders must include clear photographic evidence of artefacts showing detail to support the award of marks in addition to an overall view of the product made. Centres are asked not to send the work of all candidates when this is more than the required sample stipulated by CIE.

It is noticeable that, in Centres where candidates have been required to number all pages and include a contents page at the beginning of the folder, the design process is easier to follow and candidates tend to cover all requirements of the assessment scheme.

Comments on specific questions

Coursework

Part 1

Analysis of problem and design brief

Candidates stated clearly the problem to be addressed and this was followed by a concise design brief in the majority of cases. However, the degree to which candidates researched the design *problem* varied enormously. Candidates should be encouraged to complete adequate and relevant research in order to create a suitable knowledge base prior to the formulation of the specification. 'Cut and paste' examples should always be accompanied by comments which go beyond a simple description of the article.

Far too often this research consisted simply of information on materials, components and constructions taken directly from text books. Information of this type is totally irrelevant at this stage of a design process, and cannot be awarded marks, but should be considered at the development stage when ideas have been explored. Candidates should also be discouraged from wasting time on the history of the product area being considered unless, of course, it is absolutely fundamental to the development of the design folder.

Candidates should state clearly at this stage of the design process if the outcome is to be in the form of a model and the reasons for this decision.

Part 2

Specification

The majority of candidates included specification points but very often these were generic in nature and could be applied to any product. The specification should build up from points that emerge from the analysis of the design problem and should state clear and specific requirements for the design outcome and, for the award of maximum marks, points should be qualified wherever possible. The specification is best presented by a list of separate requirements so that subsequent reference during the exploration of ideas and the final product evaluation are straightforward.

There is a tendency for some candidates to start solving the problem itself through the specification rather than listing the points the design should satisfy.

Part 3

Exploration of ideas

This is the opportunity for candidates to show their ability to 'think with a pencil' and include evidence of genuine design creativity. Successful candidates included a wide range of different ideas presented by clearly annotated sketches. Too often candidates presented a few formal drawings that showed little design flair and tended to follow a single concept.

These ideas can be presented most successfully through simple pencil sketches and candidates should be encouraged to include everything that comes to mind however feasible it may appear at the time. These ideas do not have to be of complete products but can be mini developments of parts of ideas as thoughts come to mind. Annotations should include comment as to how an idea might link to the specification.

Candidates at some Centres made good use of ICT skills in their design folders and this is encouraging to see. However, the Moderator is not convinced that this is the most appropriate method for exploring and recording design ideas in this section of the folder.

Part 4

Development of proposed solution

This is the section of the folder where candidates take their chosen idea or selection of ideas and make further detailed decisions on form, materials, construction methods and finish to be used in the final product. Many candidates found this difficult to do and in far too many cases the final idea was simply a repeat of one of the ideas recorded in the previous section. Candidates are not required to develop more than one potential outcome.

Final drawings of the design solution were generally well presented and gave sufficient information for the manufacture of the product by a skilled person.

Part 5

Planning for production

This section must show clear evidence that the production of the artefact has been planned in advance. It should not be a record of what has already taken place, as was unfortunately the case with the work of many candidates.

Details of materials and components to be used should be included together with the main stages of the production set out in logical sequence. A suggested time plan should assist candidates and should include comment when this has not been adhered to. Candidates are not required to include detailed descriptions of basic procedures such as the preparation and simple marking out of materials, but they should be encouraged to show evidence of the planning of unusual techniques particularly those that are new to them.

Part 6

Quality of production

Candidates should be congratulated on the wide range of technologies and materials being used and this included sensible use of textiles in the manufacture of some products.

Photographic evidence indicated that some candidates were able to work to a very high standard of construction and finish to the extent that products could clearly be put to good use.

It is pleasing to see that candidates continue to take pride in the quality and success of their made artefacts.

Part 7

Evaluation

Candidates are encouraged to include photographic evidence of product testing in the intended environment or by the intended user. They can then go on to link the outcome of this testing to the original specification and make objective and qualified statements on the success of the product. This section should also include suggestions for further modifications or possible improvements to the product.

Centres are reminded that this section must be an evaluation of the final *product* as, too often, candidates referred only to issues and problems linked to the making of the artefact and/or the production of the design folder with the addition of their own subjective appraisal of the outcome. Evaluations of this type cannot be awarded marks beyond the low level of achievement.

Where the final product is a model then evaluation should be of the effectiveness of the model itself and of the potential full size artefact whenever possible.