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DESIGN AND TECHNOLOGY

Paper 0445/01

Common Core

General comments

The Examiner was encouraged by the general level of response to the question paper and candidates appeared able to access all questions. ***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 but 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 few rubric errors and candidates handed 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 interpreted the orthographic drawings correctly and conveyed all detail to their isometric view in correct proportion. Candidates who did not place point P at the front but otherwise drew an accurate view lost just 1 mark.

Question 2

(a) Candidates were able to give two safety hazards when using a wood turning lathe with inhaling dust, wood in eyes, long hair and loose clothing being the popular correct responses.

(b) Precautions to remove these hazards were usually sensible with facemask, goggles, tie back hair and wearing of apron as appropriate correct answers. The Examiner did not accept the wearing of gloves as a precaution to a hazard as this is indeed a dangerous practice on machinery of this type.

Question 3

Responses to this question were usually accurate with hammer, nut and/or bolt, steel (or any suitable metal) and screwdriver or drill being appropriate answers. The Examiner always accepts unusual or local but correct terms as answers to questions of this type.

Question 4

(a) Most candidates were familiar with the method of converting coal to electricity. Any response that conveyed the idea of burning coal to heat water or create steam to drive generators was accepted.

(b) This was the least well answered of the three parts with some candidates referring to the sun heating water to carry out this conversion. The Examiner was looking for reference to solar panels or solar cells facing the sun and collecting and converting energy in this way.

(c) As with part **(a)**, most were familiar with the use of water power in the production of electricity. Answers that referred to dams, tidal movement or simply water flow to drive turbines or the like were awarded full marks.

Question 5

(a) Candidates were able to identify an appropriate material such as acrylic, stainless steel, al etc. for the toothbrush holder and add suitable reasons for their choice.

(b) The chopping board created a few more problems with many candidates using generic terms such as wood or plastic. Centres are reminded to impress on their candidates the need for them to use specific material names in questions of this type. Correct answers gave an appropriate specific wood or plastic with reasons such as: would not damage the knife blade or reference to hygiene issues etc.

Question 6

The Examiner expected candidates to add a diagonal brace or a gusset plate to the metal frame for the award of full marks. Candidates who added more than one additional member were not penalised.

Question 7

(a) This was the least well-answered question on the paper and candidates tended to be able to name both gear systems or none at all. Worm and wheel and bevel gears were the answers being looked for although the Examiner did accept 'worm' for the 1 mark available.

(b) The advantage of the worm and wheel over the bevel gear are that it will only drive in one direction i.e. the wheel cannot turn the worm, more efficient velocity ratio, sensitive control.

Question 8

Most candidates were able to identify at least one of the material forms and the correct answers being looked for were:

(a) sheet, plate, board, veneer

(b) dowel, rod, round bar

(c) tube.

Question 9

The majority of candidates were able to identify at least two specification points for the paper carrier and many gave all four. Accepted points were: keep paper flat or rolled; lightweight for carrying; waterproof; requires carrying strap or handle; appeal to young people; secure flap or cover; large enough for A3 paper etc.

Question 10

Many candidates seemed familiar with issues linked to the management of timer supplies and this question was probably answered better than other similar questions in previous years. Candidates identified the fact that timber is a renewable resource so, with planning, new trees can be replanted to keep a constant supply. Others referred to issues linked to recycling of timber, alternative materials and selection of faster growing trees particularly softwoods.

Part B

Question11

This was by far the most popular question and candidates produced a range of ideas for the storage of writing equipment. Most design ideas were based on variations of box construction, as might be expected, but others explored the use of tubular and other shapes. It was encouraging to see that candidates were sensitive to the working environment at a desk when coming up with ideas.

(a) Candidates had little difficulty listing four points about the function of the storage system including: separating items; ease of access; cleaning; efficient use of space; not damaging pencils; small spaces for small items; portability etc.

(b) Points about the appearance of the storage system ranged from: matching the desk or working environment and looking tidy in use to being able to see the items clearly and not dominating the desk etc. As a general point, candidates should be reminded that specification points must not be a series of questions but actual requirements linked to the intended use of the article.

(c) Some candidates presented very clear and imaginative ideas indeed, indicating that they were able to 'think with a pencil'. Drawing styles were, in most cases totally appropriate and many candidates made good use of colour to enhance and clarify their drawings. As has been said before, there is no intention to specify the number of ideas presented, but 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 sometimes a temptation for candidates to present many simplistic drawings or variations on a single theme but without substance.

(d) Generally speaking, the evaluations of design ideas indicated an improvement over previous years. Candidates were more objective in their comments and made clearer links to the ideas being evaluated. This is encouraging. Candidates should endeavour to raise different points of comment for each of the design ideas rather than repeating similar themes. Evaluations tended to be successful where there was some order to the comments and this was often in tabular form. Candidates should remember to indicate, with reasons, the idea(s) to be subsequently developed.

(e) Unfortunately for a drawing of the full developed solution, 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. Candidates are free to use their own drawing method but it is important that they include not only a view of the design to be made but also all construction detail. Successful candidates achieved this by completing a clear pictorial view with different parts of the design highlighted and enlarged alongside to show construction detail. Candidates who simply draw their design in orthographic projection were often unable to provide this additional and necessary information. Candidates should ask themselves if the information provided, in whatever form, would allow an experienced person to construct the article.

(f) Unfortunately, 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. 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) Fewer candidates than in previous years attempted to describe the making of the whole product. However, candidates were often not specific about the part of the product being made. 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 all aspects of the subject by being specific about materials, constructions and tools to be used.

Question 12

This was the second most popular question and intended for those candidates who had follo graphics option. The Examiner was pleased to see that candidates gave more detailed information creation and development of ideas than in previous years. In particular this applied not just to the form of display but also its construction. Unfortunately, there was often limited information on materials to be used.

(a) The majority of candidates had little difficulty listing four points about the appearance of the display including such as: attract attention; look 'SMOOTH'; provide image of the CD or space for same; name standing out etc.

(b) Methods of joining card included: tabs and slots; slide on joining pieces; glue; 'velcro' adhesive tape; clips; staples etc.

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

(f) Candidates were familiar with the use and advantage of computers in the design of graphic products and good responses included: use of CAD databases; good presentation; ease of making changes; accuracy of reproduction; speed etc.

(g) Most candidates were able to identify a suitable item to be given away as part of the promotion of the new CD, a key ring being the most popular. Marks were awarded for the suitability of the product, the amount of detail provided and for the quality of the drawing.

Question 13

This was probably the least popular question on the paper and intended for those candidates following the Technology option. As might be expected many of the ideas for toys were based on some form of floating vessel but the Examiner was generally disappointed by the lack of imagination shown by the few candidates attempting the question.

(a) Candidates successfully identified points about the function of such a toy including: not damaged by water; little maintenance; safe in use; light in weight; transportable; appealing for young children; colourful etc.

(b) Most candidates were able to describe two mechanisms using water for movement including: water wheels; piston pump; sluice; gates etc.

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

Question14

This question was more popular than **Question 13** and attracted those candidates who were interested in solving a slightly more taxing problem. It is reassuring to see that young people are very aware of those in society who have particular disabilities and for whom special assistance and consideration is sometimes required.

(a) Candidates were able to identify functional requirements of the restraining device such as: easy to operate; fits all wheel chairs; fits all bus types; quick to secure; does not damage wheel chair; limited space on bus etc.

(b) Again, candidates indicated their familiarity with safety issues and covered: no injury to user; must not trap fingers; secure in use; does not protrude when not in use; does not endanger other bus users 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 year. **Questions 2** 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 intersections and projecting views in orthographic projection. The application of shading on sketches to show metal and wood effect is also an area for improvement.

Comments on specific questions

Question 1

Information screen

This was the second least popular question on the paper. Of those who attempted it, many failed to get the monitor in the correct position and consistent with the tilt given in the end elevation. All responses made by candidates were in 3rd angle projection. Many candidates however failed to draw the symbol correctly for the projection system used.

Nearly all candidates who attempted this question failed to construct the intersection correctly and the majority sketched in a curve. Most candidates drew the monitor without the bosses in the space between the given frame. Many candidates failed to show the monitor tilted at an angle in the plan because they failed to project the monitor correctly from the given end view.

(a) One mark was given for a correct scale of 1:10 and one mark for the correct presentation of the ratio.

(b) The symbol for 3rd angle projection was required. One mark was awarded for the correct symbol and up to two marks for an accurate drawing.

(c)(i) Up to 3 marks were awarded for the construction of the intersection of the two parts **A** and **B**, and up to 2 marks were given for the accuracy.

(ii) Most candidates drew the monitor the correct width (1 mark), but failed to score the 3 marks awarded for the horizontal lines projected from the given end elevation. A large number of candidates scored two marks for the monitor screen size. Two marks were given for correctly drawing the bosses.

(d) The plan was complete by nearly half the candidates who attempted this question. All candidates failed to draw in the centre line on the plan view. A few candidates managed to score the 2 marks that were available for projecting from the two given elevations. Most candidates drew diameter **A** in position (1 mark), but failed to copy the given symbol to show the ends had been cut. Again, the monitor was drawn the correct width (1 mark) by most candidates but many failed to score all 3 marks available for each of the horizontal lines projected from the tilt of the monitor.

Question 2

Electronics company illustration

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

(a) Many candidates drew an ellipse the correct size (2 marks). However, a large number of candidates erased their construction lines making the 3 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. Where a trammel was not evident only 1 mark was awarded. A few candidates failed to draw the ellipse in the correct orientation (1 mark). An accurate outline gained a further 1 mark.

(b) Many candidates found the drawing of a heptagon (7 sides) difficult. 1 mark was given for drawing a polygon with 7 sides and two marks if the polygon was regular. 1 side of the polygon drawn in the horizontal plane was awarded 1 mark. Very few candidates drew the polygon circumscribing the circle (1 mark).

(c) Many candidates attempted to divide the circle up into a pie chart but failed to realise that the $ amounts in thousands were the same as degrees of the circle. Many candidates were inaccurate in dividing up the circle and failed to score the full 3 marks. Annotation was awarded up to 2 marks.

(d) The drawing of the letters **H** and **P** in the given space was done by nearly all of the candidates, but many failed to read the question fully. The letters were to represent an electronics company. Where candidates had read the question fully, seven bit display type letters gained full marks.

(e) For the full 5 marks, suitable colouring of even texture and accurate application was required.

Question 3

Perfume bottle

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

(a) Most candidates completed the orthographic view by projecting a plan. Many scored 1 mark each for the width, height and ends but failed to score 1 mark for the circular cap.

(b) Most candidates drew a development with six sides (6 x 1 marks). Many failed to take in the overall height needed to include the cap (1 mark). Glue flaps varied in size (1 mark) and relevant number (1 mark). Quite a few developments were not a viable one-piece construction (2 marks). Many developments failed to have a tuck-in flap (2 marks) for the opening lid.

(c) Many candidates scored well on this part of the question.

(i) Two ideas investigated scored 2 marks with quality of sketching scoring 1 mark.

(ii) A logo representing the name 'starlight' was awarded up to 3 marks and the accurate drawing of this logo on the front view scoring up to 2 marks.

(iii) Most candidates scored 2 marks for the effective use of colour.

Question 4

Plaster-cast mould

This was the least popular question on the paper.

The few candidates who attempted the question failed to score many marks. Whilst the product used for this question is not very common, candidates failed to assemble the simple parts in the correct order (3 marks). The question asked for a half size isometric view of the assembled mould, giving the order of assembly clearly in the question. Responses by the candidates showed that they had assembled the parts in any order they wished.

Of the candidates who attempted this question, many drew the isometric to the correct axis (3 marks) and the correct scale (1 mark). The rendering of the four separate wooden parts was not done well by candidates (3 marks) and very few candidates scored marks for the rendering of the bolt head to make it appear round (1 mark) and made from polished metal (2 marks). A freehand view of the casting that could be made by the mould was attempted by only a small number of candidates. Several drawings of a circular shape with a square hole were produced instead of a square boss on a circular shape that has a flat side.

Paper 0445/03

Realisation

General comments

There was a very good knowledge and understanding of the working properties of plastics demonstrated by candidates answering **Question 3**. The knowledge and understanding of the working properties of solid woods, manufactured boards and metals was much weaker.

The quality of communication skills was variable. Some candidates were able to provide excellent, large and clear sketches accompanied by technically accurate notes. This is very important when answering those questions that start with the words, “Use sketches and brief notes to describe….”. Those candidates whose sketching skills and knowledge of technical detail was poor therefore were unable to communicate their answers effectively.

Comments on specific questions

Question 1

(a) Many candidates gave sensible design features and improvements to the toy, including the use of colour, rounded corners for safety and the use of string to pull the toy along.

(b)(i) The majority of candidates drew an eccentric or pear shaped cam that would make the driver move up and down.

(ii) There were several names given for the pear shaped cam, including oval, egg and elliptical. These answers were rewarded.

(iii) The majority of candidates understood that the purpose of modelling was to test the mechanism.

(iv) There were many correct answers to this part. Only a snail cam would work.

(v) Not every snail cam drawn in part **(iv)** was named correctly in this part.

(vi) The majority of candidates who drew the snail cam accurately also understood that it was capable of moving in one direction only.

(c) To achieve maximum marks for this question, candidates needed to show an axle connected to the body of the toy, a clearance hole or some form of clearance for the wheel to move, some form of spacer or washer and a means of retaining the wheel onto the axle.

(d) Many candidates failed to achieve maximum marks by naming generic materials such as metal or plastic rather than specific materials. In some cases inappropriate specific materials named. The body and cabin could have been made from plywood, the wheels from close-grained hardwood such as beech and the axles from steel.

(e) The best reasons included the hardwearing nature of the material, its toughness and durability.

Question 2

(a)(i) Few candidates understood the term 'preparation' and were unable to achieve many marks for this part. To prepare wood involves measuring, marking out, sawing, planing and testing. To prepare veneers involves marking out, measuring and cutting. To prepare metal involves marking out, measuring, cutting, filing and testing.

(ii) Candidates needed to make sketches of jigs, formers or templates that would be used to make the roof. There were some good sketches of male and female formers to assist laminating veneers but candidates were less clear about how these could be used when working with solid wood or metal. Very often, candidates produced sketches describing how the roof could be made. This was what was required in part **(iii)** and these answers were rewarded.

(iii) Because of a lack of understanding in part **(ii)** many candidates were unable to describe accurately how the roof could be made in this part of the question. Very often, the answers were a repeat of part **(ii)**.

(iv) Many candidates used dowel joints to join the roof and posts when the materials were made from wood. The best answers included the term 'blind hole' or specified a depth and included use of PVA glue. Joining the parts together when made from metal was badly answered with many references to welding. Only the minority of answers involved the use of hard or silver soldering when the materials were made from brass.

(v) Those candidates who provided a similar method to part **(iv)** were rewarded.

(b) Many candidates produced good answers to this part of the question.

When using wood candidates included some of the following stages and named the tools: glasspapering with a cork block/rubber, various grades before using a paintbrush or spray to apply an appropriate finish.

When using metal candidates included details of filing, wet or dry paper or emery cloth, polishing mop and compound.

(c) There were many excellent answers to this question with candidates demonstrating a good understanding of the terms; 'manufactured board', 'non-ferrous' and 'hardwood'. The examples given in the majority of answers were correct.

Question 3

(a)(i)-(iii) Generally, the knowledge demonstrated by the candidates of the tools and equipment needed to mark out, cut and finish acrylic was very good. The vast majority of candidates were able to name the correct tools and sketch them. Some candidates achieved maximum marks for this part.

(b) There were two dangers identified in the answers of the majority of candidates: one relating to the fact that acrylic can snap easily if the part being worked on is too high out of the vice; the other to the likelihood that the surfaces of acrylic scratch easily and therefore these need protection.

(c) There were many very good answers to this question. The best answers referred to the use of a strip heater or line bender, sketched it and then gave details of how a jig or former would be used to bend the acrylic to the required shape.

(d) Many candidates correctly referred to the use of a rubber strip onto the base of the menu holder.

(e)(i)(ii) There were many very good answers to these questions with candidates demonstrating a sound knowledge and understanding of the differences between thermoplastics and thermosetting plastics. The answers in part **(ii)** giving actual examples of the two types of plastics were not quite as good as the answers in part **(i)**.

Question 4

This question proved to be the least popular choice of the four on this paper.

(a) Most candidates gave steel as the suitable metal. For maximum 2 marks the specific name, 'mild steel' was required; otherwise candidates were awarded 1 mark.

(b) Most of the answers to this part related to why steel was suitable rather than why tube would be used.

(c) The important part of this question involved the 'preparation' that would be carried out to the material before brazing. Candidates were expected to recall stages including filing to the correct angle, cleaning up the joint using emery cloth, the application of flux and the securing of the metal on the brazing hearth. Very few candidates were able to provide more than one or two of these stages.

(d) The terms that candidates were asked to describe were directly connected to the brazing process. The terms are basic and it was disappointing that the majority of candidates were unable to describe them accurately.

(e) There were only a few good answers to this part. The rods were to be held without brazing or welding. The best answers included the use of drilled holes in the top and bottom parts of the frame and the use of screws to locate. In some cases candidates used brazing or welding even though told not to in the question.

(f) Many candidates were able to gain marks for this 'design-type' question. There were practical methods of hanging the gate shown, including the use of lift-off pins and 'hooks'. Candidates tended to be weak in the accuracy of technical detail required to describe how the parts could be connected and the materials from which they were made.

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.

Comments on specific questions

Question 1

This was a popular question and most candidates were able to attempt all parts of the question with varying degrees of success.

(a)(i) Few candidates were able to identify the pin was under shear force in this situation.

(ii) Descriptions were largely inaccurate where candidates had failed to identify shear force on the pin.

(iii) Most candidates were able to identify a property of mild steel that made it suitable or were able to state that it is a readily available or inexpensive material.

(iv) Most candidates were able to identify that rust is a major problem in using mild steel.

(b)(i) Many candidates were able to show torsion by the appropriate and effective use of sketches.

(ii) Many candidates were able to give a further appropriate example of torsion.

(iii) Most candidates stated Tension and Compression forces.

(c) This part was not well answered by many candidates. Most marks in this part were gained by reasons for the welded joint and the nuts/bolts joint. Few candidates were able to explain the advantage of using gusset plates to spread the load and brace a joint.

(d) This part was not well answered by many candidates. There was little or no knowledge of graphical methods for determining the forces in the structure. Similarly many candidates were unable to identify ties or struts within the framework.

(e)(i) Few candidates focused on the rigidity of this section.

(ii) Most candidates were able to identify the addition of the members to stiffen the sheet and reduce buckling effects.

(f) Many candidates were able to explain the effects of reinforcing the beam to improve its ability to carry tension forces.

Question 2

This question was not a popular choice. It was apparent that some candidates had experienced electronics and were able to use their experience to support responses.

(a)(i) There were some very good responses to this part with good sketches well annotated to explain the principles of strain gauge operation.

(ii) This part was not well answered by most candidates with few being able to complete the circuit successfully.

(iii) This part was not well answered by candidates with little or no understanding of the need to limit the gain of the 741 by using feedback.

(iv) There were many sound responses to this part.

(b) Most candidates were able to identify the Thermistor as a temperature sensor.

(c)(i) There were some excellent annotated sketches of the reed switch and its mode of operation by many candidates.

(ii) Many candidates were able to identify the use of a Darlington pair to increase response time and sensitivity of the amplifier circuit.

(iii) Fewer candidates were able to demonstrate knowledge of the use of VR to adjust the sensitivity of the ORP12 sensor.

(iv) This part was not well answered by many candidates. There was little or no knowledge of Dual In Line Reed Relay IC.

(v) A few candidates were able to clearly show how a reed switch can be used as a proximity switch in either a door or window frame and it was clear that these candidates had some hands on experience of using reed switches.

(d)(i) This part was not well answered by many candidates. Few were able to show that the use of the VR could enable the user to vary the value of resistance and thus the value of time delay.

(ii) A small number of candidates were able to draw the typical charging curve.

(iii) A small number of candidates were able to identify the importance of connecting electrolytic capacitors according to their polarity.

Question 3

This was a fairly popular question and most candidates were able to attempt all parts of the ques varying degrees of success.

(a)(i) Most candidates were able to identify two forms of modelling including; kits, CAD, and ca modelling.

(ii) Most candidates were able to identify either strain gauge or DTI as accurate methods of measuring deflection.

(iii) Most candidates were able to explain the term 'moments'.

(iv) Most candidates were able to perform the calculation effectively showing a clear understanding of equilibrium in loaded systems.

(b)(i) Most candidates were able to identify friction as the major problem for efficiency in this situation.

(ii) The diagram was in most cases labelled completely correctly.

(iii) Most candidates were able to identify another form of bearing.

(iv) Many candidates were able to name an appropriate example of the use of the bearing type they had identified in part **(b)(iii)**.

(c)(i) This part was not well answered by the majority of candidates who did not explain the use of batteries to store and release electrical energy on demand.

(ii) Most candidates were able to identify the portability of devices that used batteries as power sources.

(iii) Most candidates were able to sketch a battery symbol though there was some confusion over the polarity of the symbol.

(iv) Most candidates were able to clearly show the difference between a battery and a cell.

(d)(i) Most candidates were able to identify the microswitch as a suitable device.

(ii) Most candidates were able to draw the circuit symbol for a toggle switch in its 'off' position.

(iii) Very few candidates were able to sketch a toggle switch correctly fitted to an acrylic control panel.

Question 4

This was a popular question and most candidates were able to attempt all parts of the question with varying degrees of success.

(a)(i) Most candidates were able to identify the screw mechanism.

(ii) Most candidates were able to describe the motion conversion of rotary to linear motion that takes place when the screw mechanism is operated.

(iii) Fewer candidates were able to identify the main drawback as being the many number of turns needed to move a small linear distance with the screw mechanism.

(iv) Most candidates were able to show that by using of a cranked handle the operation is made quicker and easier.

(b)(i) Most candidates were able to identify that lubrication makes the operation smoother and inhibits corrosion.

(ii) Few candidates identified grease as the best lubricant.

(iii) Few candidates were able to identify that grease is used because it will not degrade as quickly as oil and will stay in place more effectively.

(c)(i) Most candidates were able to label the figure correctly.

(ii) Few candidates identified that brass is used because it has good anti-corrosion properties.

(iii) Most candidates were able to fully label the figure correctly.

(d)(i) Most candidates were able to calculate the correct value of MA for the system.

(ii) Most candidates were able to explain the relationship between the load/effort and the wheel and axle radii (MA).

(iii) Most candidates were able to perform this calculation correctly.

Paper 0445/05

Coursework

General comments

A wide range of coursework projects was presented by candidates and in the majority of cases the choice of topic had clearly emerged from a real problem in the candidate's home, school or local community. In addition to the usual range of household items and furniture, interesting outcomes included: barbeque cover; car park barrier system; folding chair; point of sale display; wind tunnel for model car testing; packaging for chocolates; television advertisement; ironing board; carrier bag designs; model skateboard park; wine storage system; painting easel; airline advertisement; model bridge design; doll's house; child's sleeping aid and an automatic plant watering system.

It is important that Centres support and guide candidates in the selection of their design problems so that they take on tasks that are both manageable and provide the opportunity for them to respond to all parts of the assessment scheme.

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 candidates' marks and must also include the highest and lowest marks awarded. Where marks have been internally moderated it is helpful to the Moderator if changes to individual criterion marks can be indicated in addition to total marks. The Moderator would like to thank the majority of teachers who provided assessment documentation clearly set out in line with CIE's requirements.

All folders must include clear photographic evidence of made artefacts showing close up 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 assessment headings

Analysis of problem and design brief

The majority of candidates stated clearly the problem to be addressed and this was usually followed by a clear design brief. 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' extracts and drawings of other existing artefacts should always be accompanied by notes that comment, in some way, on the item being shown. Comments and annotations can be either on the suitability of the item in the context of the design brief or on any other feature that may be useful in the subsequent creation and development of ideas.

Unfortunately, as has been pointed out before, many Centres are still allowing their candidates to include information on materials, components and constructions taken directly from textbooks. Information of this type is totally irrelevant at this stage of a design process, and cannot be awarded any 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.

It is accepted that many product outcomes will be in the form of models. This may be because a full size artefact would be beyond the facilities at the Centre or the time constraints of the course being followed. Candidates following the Design Communication option within the syllabus will often produce models as a natural outcome of the subject content. This is perfectly acceptable, and expected, but it is important that candidates make this absolutely clear in their design brief so that all subsequent work, especially the specification, design development and evaluation, focuses on the model.

Specification

It is worth pointing out that this section of the design folder is awarded the same number of marks as the previous one. It is not always obvious from work presented that candidates are aware of or appreciate this.

All too often specification points are generic in nature and could be applied to any product. For example, 'Must be safe in use' does not tell the reader very much and must be qualified with a reason linked to the analysis or brief if it is to be considered for the award of marks. 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 is straightforward.

The specification should not start to solve the problem by listing materials, constructions and the like but should emerge from the analysis of the problem and should state clearly the specific design requirements for the final outcome. At this stage the design should still be very open so that all possibilities and ideas can be considered.

Exploration of ideas

This section of the design folder is awarded the highest number of marks and in many ways is the most important. It is the stage at which candidates can go off in almost any direction from the specification and explore a variety of avenues for solving the design problem. The Moderator would expect successful candidates to include a few surprises in their design thinking. It is the opportunity for candidates to show evidence of their ability 'to think with a pencil' and include examples 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. Although there were not so many examples this year, the Moderator is still not convinced that use of a computer drawing package is the most appropriate way of exploring and recording design ideas in this section of the folder.

Development of proposed solution

This is the section of the folder where a candidate's chosen idea or selection of ideas becomes rea... the point at which they need to consider alternatives and make final detailed decisions about form, ma... construction methods and finish to be used in the product realisation. Many candidates found this difficu... do and in far too many cases the final idea was simply a repeat of one of the ideas recorded in the previou... section. Most candidates must make decisions leading up to the detail of the product to be made but, unfortunately, they do not always keep a record of their thought processes. Candidates are not required to develop more than one potential outcome.

Most candidates showed their ability to produce formal drawings and final design solutions were generally well presented and gave sufficient information for the manufacture of the product by a skilled person.

Planning for production

Some candidates gave themselves away by writing this section of the folder in the past tense. The planning must show clear evidence that the production of the artefact has been thought about in advance. It should not be a record of what has already taken place, as was unfortunately the case with the work of far too 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.

Quality of production

Some candidates should be congratulated on the very high standard of their practical work. Clearly, some products had been made very well and as such could perform the intended purpose. There was evidence of a wide range of technologies and materials being used and this included sensible use of materials beyond the expected: wood, metal and plastic in the manufacture of some products.

It is clear to see that candidates enjoy this part of the course and continue to take pride in the quality and success of their made artefacts.

Where a model forms the basis of the made product it is important that appropriate materials are used and that the same high standards are maintained. An architectural model will never convince potential customers if it is poorly made.

Evaluation

This section of the folder should open with some evidence of consumer or user testing in the intended environment. This may be in the form of photographs or a written record of what has happened. Evidence of questionnaires can play a part in this but by themselves they often say very little. Candidates should 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 the evaluation should be of the effectiveness of the model in relation to the potential intended full size artefact whenever possible. Unfortunately candidates often simply commented on the model in its own right and did not relate the evaluation to its intended purpose.

Fitness for purpose

It is quite difficult for the Moderator to comment on this section in any meaningful way, as it was not possible to handle or use the made products. However, it is important that Centres make use of the full mark range when making this assessment so that fair and sensible discrimination is made between candidates. The Moderator is never really convinced when the work of all or most candidates at a Centre appears to be a 'Completed solution fulfilling the brief' and, as such, is awarded full marks.