

# CDT: DESIGN AND COMMUNICATION

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Paper 7048/01  
Structured

## Key messages

Whilst many excellent answers were seen, the following were considered to be areas where improvement could be made:

- the development of a standard packaging carton;
- the drawing of circles in isometric;
- the knowledge of manufacturing processes used with plastics;
- the recognition of common symbols and their meaning;
- the correct positioning of views in 3rd angle orthographic projection;
- the method of drawing an ellipse given the major and minor axis;
- the application of shading and thick and thin lines to enhance a pictorial object;
- the use of the correct convention in sectional drawings;
- the ability to draw the interpenetration of cylinders;
- the drawing of a regular polygon given the length of side;
- the ability to draw a planometric view given orthographic views;
- the ability to draw in two point perspective given VP1 and VP2;
- the drawing of a given shape that involves circles and arcs that touch;
- the drawing of a flow chart when the process includes decisions;
- the drawing of a simple mechanism that creates movement.

## General comments

Candidates were required to complete **one** question from Section 1 (Q1 or Q2) and **two** questions from Section 2 (Q3–Q6). This rubric instruction was followed by the majority of candidates but a number of candidates (15%) answered more than three questions. It would be beneficial to candidates if they were made aware that all the questions were not to be attempted and to follow the rubric instructions.

Question 1 was the most popular of the Section 1 questions. Question 4 and 6 were the most popular of the Section 2 questions.

It was clear from the responses that there are many able students who were well prepared for the examination.

Centres are reminded not to secure the papers together with string, staple, paper clip or a treasury tag. Candidate's answer sheets should be placed in the despatch envelope in the order listed on the attendance register. It is however, very important that the candidate completes his/her own details on all working sheets.

## Comments on specific questions

### Question 1

This question had been formatted to give the candidate the centre lines to be used to draw the view required.

- (a) Candidates were required to complete the isometric view of the yoghurt pot to the sizes given. A smaller drawing gave candidates the orientation required.
- (b) (i) Candidates were asked to name the manufacturing process commonly used to produce plastic yoghurt pots. Acceptable answers were Vacuum forming and Blow moulding.

- (ii) The reason for either manufacturing process is that they are suitable for mass production and large quantities can be produced from a single former.
- (c) The symbol given is found on yoghurt pots. The symbol identifies the plastic (polypropylene) and enables the correct recycling to take place.
- (d)(i) Candidates were asked to complete the drawing of the banana by adding the remaining half in the same style.
- (ii) Candidates were asked to draw a strawberry in the same style as the cherry. Shading and highlighting was required for full marks.
- (e) This question required candidates to draw the card sleeve by completing the unfinished development. Correct answers showed two trapezoids and a rectangle in the correct size and in the correct order. A glue flap was to be added to the left of the development as indicated by the given fold line. Fold lines drawn by the candidate were required to be to the correct convention (as those already given).
- (f) This question asked for two other methods than a graph to illustrate sales of different types of yoghurt. Most candidates responded with two from the following: pie chart; bar chart; or histogram.

## Question 2

Two incomplete orthographic views of a bird shape made from foam board were given. Candidates were asked to finish the orthographic drawing of the bird by completing:

- (a)(i) the plan in the direction of arrow **P**;

*This required the second wing to be drawn and two lines added to show the corners of the hexagon shaped head.*

- (ii) the front view in the direction of arrow **F**;

*This required the beak to be completed, the top right side 30° line of the hexagon to be completed and the right side upright of the hexagon to be drawn.*

- (iii) the end view in the direction of **E**.

*This required the two wings and the tail to be added. Two lines representing the head were to be added in the correct position.*

- (b) The question required candidates to draw the projection symbol for third angle projection in the box provided.
- (c) Using the centre lines given, candidates were required to complete the full size drawing of the body of the bird by constructing an ellipse given the major and minor axis. Correct solutions showed the ellipse to size with supporting construction. The left hand part needed to stop at the bottom of the hexagon head with the upper part stopping at the side of the hexagon.

Candidates, who used a trammel and did not include it with their examination paper, were not awarded the marks for evidence of construction.

- (d) Candidates were asked to name from given drawings, a trapezium and an isosceles triangle.
- (e)(i) A suitable adhesive to join the foam board would be PVA, Pritt stick, latex glue or double sided tape. Solvent based glues were not considered to be appropriate
- (ii) Any method showing a cross-halving type joint, centrally placed, was deemed to be an acceptable method of fitting the tail to the body.

### Question 3

A small number of candidates attempted this optional question.

Two parts of a plastic toy were given as part A and part B.

- (a) (i) Candidates were required to render part A to look like shiny plastic. Correct solutions showed graduated shading to the curved surfaces.
- (ii) Thick and thin lines were to be added to part B to enhance its appearance. Thick lines were to be added to all lines where only one side of the edge can be seen.
- (iii) Candidates were asked to give two reasons why plastic is a suitable material for the toy building kit. Correct answers included: easily moulded, hygienic, non-toxic, washable, available in many colours, suitable for quantity production.
- (b) This part of the question required candidates to complete the drawing given to show a sectional view of part A and part B fitted together.

Correct answers showed –

- The right hand half of B added as a mirror of the left hand half.
- Part A drawn in proportion on the centre line and touching part B.
- The right hand half of B hatched to continue the hatching from the left hand half.
- Hatching drawn on part A in the opposite direction to that on part B.

- (c) This question required candidates to explain what is meant by ‘push fit’

Correct answers had to include –

- The parts must ‘push’ together.
- Must not fall apart.
- Parts can be separated with some effort.

- (d) A sketch showed a ‘T’ shaped part of the plastic building kit. An incomplete orthographic plan and elevation of the same part was also given. Candidates were asked to complete the side view. The curve of interpenetration of the two cylinders was required to be drawn.

An R20 arc needed to be drawn on the  $\text{Ø}40$  part on both the plan and side view. This semi-circle needed to be divided into a minimum of 6 sectors. Lines were then to be drawn along the  $\text{Ø}40$  part on both the plan and the side view.

Where the lines touched the  $\text{Ø}50$  circle on the plan, the point of intersection was to be drawn down and plotted on the corresponding line on the side view. A smooth, continuous line would then describe the curve of intersection.

### Question 4

- (a) Candidates were required to complete the table to show four different shaped cheeses divided into portions.
- (i) The sides of the square were to be bisected and opposite sides joined to get four equal squares.
- (ii) A  $\text{Ø}40$  circle was to be drawn and divided vertically and horizontally to give four equal sectors.
- (iii) A regular octagon was to be drawn given the length of one side. The corners were then to be joined across the centre to give eight equal isosceles triangles.
- (iv) By dividing the angles of the equilateral triangle, three equal triangles are produced.

- (b) Two orthographic views of a circular cheese with a 90° portion removed was given with full dimensions. Candidates were asked to draw a 45/45 planometric view of the cheese.

Many candidates did not draw the circle in true shape. Many candidates drew a portion removed but not always to the correct size/thickness.

- (c) Many good designs of 'Charlie Cheese' were seen. Most candidates achieved a cartoon character that reflected the name and cheese shape.

### Question 5

A very small number of candidates answered this question with success.

Candidates were given the information that ten building blocks had been arranged in a pattern shown to make a set of steps. The relative size of one block and the relative sizes of the width and depth of the steps were shown.

- (a) Candidates were asked to complete the two point perspective drawing of the steps. From the given information and the incomplete drawing, the outer shape could be drawn in proportion. Four steps should then have been drawn to the front face (dividing the vertical front edge into four) and these referenced back to VP1 and VP2 to enable the front and back edges of the steps to be drawn. The final outcome should show 4 steps reducing in height and width with the top face of the first step clearly visible.
- (b) A design for 15 blocks to create a set of five steps was achieved by many candidates. Most appeared to use the set given in (a) with a layer added.
- (c) This question proved difficult for many candidates whilst the solution may have been within their experience with 'Duplo' or 'Lego'. The front row made a step of three to a horizontal landing across to a block on the back row. Moving left one block higher took the flight of steps to the top step.
- (d) Whilst appearing to be straightforward, this question required candidates to have knowledge of auxiliary views. Lines at 90° were to be projected from the sloping face and the width plotted to give the true shape of the face. The location of the bottom of the arrow along with the height of the shoulder and the point needed to be projected to the right to meet the sloping face and then projecting at 90° onto the true shape. The centre line and relative widths could now be plotted to give the true view of the arrow on the sloping face.

### Question 6

A large number of candidates attempted this question.

- (a) Candidates were required to complete full size the drawing of a logo. Many candidates completed the drawing of the square within the given circle and the Ø30 circle 65 to the right of the given circle vertical centre line.

Determining the centre of the R25 proved very difficult for many candidates. A R25 arc was to be drawn from the R/H corner of the square on the centre line and a second arc of 25 drawn from the centre line of the Ø30 circle where the arc was to touch.

The extension of the arm at 45° for a distance of 35mm did not present a problem. Many candidates however, did not draw the rectangular box for the word WEB large enough (or in proportion) to fit in the lettering required.

- (b) (i) This part of the question required candidates to draw a flow chart showing the stages in a recruitment process. The stages were listed and candidates were required to draw a series of process boxes below and in line with the given start.

Four additional boxes were required with a STOP box showing END. The boxes were to be linked by arrows.

- (ii) This part of the question asked where and why a decision box would be added. Correct answers gave a position between stages 2 and 3 or between 4 and 5. The reason required was that it gave an alternative route with a YES and NO. Some candidates had inserted a decision box in the flow chart and this response was accepted and marked.
- (c) Candidates were required to complete a visual display by adding the mechanism needed to make the middle person move up and down when a handle was turned. The response required had to include –
- A handle that could turn a shaft.
  - A suitable cam fixed to the rotating shaft that would produce an up and down motion with one turn of the handle.
  - A suitable cam follower attached to the middle person that would give a smooth motion.

The response had to be drawn in the same orientation and within the confines of what had been given on the examination paper.

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Paper 7048/02  
Coursework

## General comments

A good number of the candidates had used the assessment criteria headings to identify the different sections of their work and should be congratulated on the clear presentation of their folders. Some candidates had made use of ICT and in a number of cases good computer generated graphics work was seen. It was, however, important to maintain an appropriate balance between computer and hand generated work. As has been reported in previous years, some candidates still tended to spend far too much time on the Research and Analysis section, sometimes at the expense of other areas of their coursework folders. The mark allocation given in the assessment criteria provided a good guide as to the amount of time that should have been spent on each section of the coursework.

## Comments on specific tasks

### **Problem identification**

At the highest level a good understanding of the design need and user requirements was demonstrated and a clear design brief had been derived from the design situation. At the lowest level candidates had done little more than to write a simple design brief.

Many candidates scored high marks in this section. Candidates had obviously been able to select a design problem, from those given in the question paper, which was of interest to them. It was at this stage that the intention of the project needed to be identified and set out clearly. The majority of candidates had successfully done this by sensibly basing their work in a local context and on a situation that they were familiar with. In the majority of cases a clear Design Brief had been written although in some cases design briefs were not specific enough.

### **Research and analysis**

At the highest level the research involved identifying the key areas of investigation that needed to be undertaken for the chosen task and then collecting and analysing data which would influence the design activity. At the lowest level the research largely consisted of collecting irrelevant images or information.

This section provided candidates with the opportunity to consider all aspects of the design problem they have chosen to base their project on. Before collecting and analysing information candidates should have been encouraged to ask themselves the following questions, 'What do I need to know?' 'Why do I need to know this?' 'Where will I find the information I need?' 'How will I use what I have found out?' Candidates needed to understand that the research they undertook needed to be focused on, and be relevant to, their chosen design problem.

A fair number of candidates looked, in an appropriate way, at existing situations or solutions so that they could draw on this experience when producing their own solutions to the design problem. However, as has been reported in previous years, many candidates gathered general information on materials, construction techniques and other aspects which had little or no relevance at this stage of the design process. This type of information was often taken directly from the internet or textbooks. Candidates needed to understand that this approach simply wasted time and would not be awarded marks.

The majority of the work undertaken in this section needed to be based around the research requirements outlined on the question paper. It was important that all research was analysed, it was not sufficient to just collect and describe a series of photographs.

### **Specification for a possible solution**

At the highest level the specification points were specific, based upon the research undertaken and completely defined the proposed product(s). At the lowest level the specification points were general and could have been applied to almost anything.

The specification was worth 10% of the total marks available and, as such, should not have been treated lightly. The more successful specifications were those where candidates had drawn on the results of their research and analysis to produce a list of specific requirements that their design solution must meet. Candidates needed to understand that a detailed and meaningful design specification would form a useful aid for both producing their design ideas and for the evaluation of the final solution. In a good number of cases specifications were far too general in their content. The better specifications justified why particular features needed to be included. For example, 'The product needs to be made from a waterproof material because ...'

### **Proposals for a solution**

At the highest level candidates design thinking was original and based on exploring ideas through on going evaluation and further research. At the lowest level candidates focused on a single idea.

This section provided the opportunity for candidates to be really creative and to record and consider a range of different ideas for a solution to their chosen design problem. Successful candidates did not restrict themselves to one or two basic ideas but produced a range of distinctly different design proposals which were well communicated using a variety of graphic techniques.

It was important that candidates annotated their design drawings and recorded their thoughts on each idea for possible future development. It was these notes that indicated to the reader how and why the candidate's ideas have been produced and developed.

A good number of candidates failed to carry out any real design development. In these cases they simply selected an idea and made it.

Many candidates should be congratulated on the high quality of their drawing skills in this section of their design folders. The use of free flowing sketches rather than formal, instrument-drawn illustrations should have been used at this stage of the work.

### **Realisation**

At the highest level the making was complete and of an excellent standard resulting in products that functioned as intended. At the lowest level the making was incomplete and of a low standard resulting in products that did not function as intended.

Candidates needed to include a number of high quality drawings and photographs of their final outcome in their folder as this is the only evidence of the final product that was seen by the Moderator. Not all candidates did this. It is difficult to comment in detail about the products that had been made but the majority of the work appeared to cover the intended range of appropriate materials and making skills and techniques.

There needed to be evidence that a candidate had planned the making of the product or model that they had designed. This should have included details such as sizes, the materials that would be used, the construction techniques that would be used and the tools and equipment that would be used.

It was important that photographs showing the candidate making their product were annotated to explain what was going on in the photograph.

## Evaluation

At the highest level the product(s) had been fully tested against the specification and by gaining the opinions of potential users. As a result of this testing detailed proposals for justified improvements had been given. At the lowest level a few subjective comments were made about the product(s).

Although some candidates continue to use ticked boxes against specification points, many others gave sound objective comments to indicate the success, or failure, of their solution. Candidates needed to understand that as a result of objective testing meaningful recommendations for improvement and modification could be made.

Some candidates did not attempt this section of the Assessment Criteria.