

DESIGN AND TECHNOLOGY

GCE Ordinary Level

Paper 6043/01

Paper 1

General comments

The performance of candidates was very much in line with last year and shows a continuing decline in workshop knowledge and understanding of both processes and techniques. Some of the questions asked on simple processes caused major problems, with many candidates mixing up wrong tools or wrong processes for the chosen material.

Many of the comments made in last year's report remain true for this year's candidates and results. Time has not been an issue as nearly all candidates completed the required rubric of the paper. However, answers once again lacked the technical depth required to gain the very highest grades. In general it was a good average performance.

Comments on specific questions

Part A

Question 1

Few candidates understood the real function of the hearth or the purpose of the bricks. Some stated that it was for holding sand. Many, however, did give a heat process.

Question 2

This was a well answered question with most candidates able to sketch good supporting drawings of the required wood joints.

Question 3

- (a) There were some correct answers but many gave the hot wire and burning as the danger.
- (b) Quite a number did not understand the term G.R.P. and thought it was another plastic heating process.

Question 4

- (a) This was well answered with most giving folding bar.
- (b) Most were able to give the purpose as bending tool but a number failed to mention sheet metal.

Question 5

This was quite well answered but many referred to the purpose of a design brief but not the requirement.

Question 6

This was a well answered question.

Question 7

This was well answered, with most giving the sash and G or F clamps as the solution.

Question 8

Many candidates did not attempt this question for what seemed to be a lack of technical knowledge. Those that did only answered part (c) and tended to give autosol as the polishing medium.

Question 9

Very few candidates had any understanding of the term 'curing' when related to plastics.

Question 10

- (a) Most candidates gave holes for insect damage.
- (b) A wide range of answers with shakes, rot, etc as the damage being caused by weather. A number got confused by saying that bad weather, such as lightning and thunder, caused thunder shakes when it's bad felling.

Part B

Section 1 -Tools and Materials

Question 11

- (a) This was a popular question for nearly all candidates. However, they often repeated answers for all three materials. Acrylic was perhaps the best answered.
- (b) Most knew the tools but few sketched them well, especially the coping saw. Others misread the question and gave a written report on a process.
- (c) There was a mixed response to finishing with many having no idea how to improve the surface of copper. Some gave plastic coating, others gave spray paint - all totally unsuitable. Acrylic was much better understood and Birch plywood was normally varnished or given a coat of lacquer.

Question 12

- (a) Most candidates were able to give a hexagonal headed bolt but few understood a coach bolt or its use.
- (b) This was quite a simple question but caused many problems for candidates. A number understood a wing nut as a hand turning system but failed to draw it well. The hexagonal nut proved more difficult with many giving it six or eight sides, no hole, or a hexagonal hole, or no thread.
- (c) Reasonable sketches for the two tools, which in the main tended to be a spanner and screwdriver.
- (d) The common answer given for a washer was to 'protect work', few gave 'spread the load'.

Question 13

This was not a popular question.

- (a)(i) Some candidates gave strength as a reason for plywood, but few suggested it was available in large size sheets.
- (ii) G.R.P. - again most candidates have a poor understanding of this material; the only answer was boats.
- (iii) Duralumin - most gave the aircraft industry and that the material was strong and lightweight. No one mentioned its real advantage, which is age hardening

- (b)(i)** Most attempted the fluidizing process but only gave partial answers while others melted the plastic powder.
- (ii)** There were reasonable answers for bending beech, but a common error was to heat wood directly and bend by hand.
- (iii)** Some good answers on heat treatment but a number mixed it up with case hardening
- (c)** This was usually understood with plastic coating, galvanising as the main answers.

Question 14

This was a popular question, not always answered well.

- (a)(i)** Most candidates gave two out of three weaknesses for the design.
- (ii)** Not always the correct improvements were given, mostly rounded corners with a metal file.
- (b)(i)** Tools were usually correct but the process of marking out was poorly done, with few giving centre line construction or marking distances.
- (ii)** Few worked the two pieces together for drilling or turned them over for further drilling. In this way the holes would align correctly. Only a small number considered the blind holes and setting the depth on the drill.

Question 15

This was a very popular question.

- (a)** Most gave at least one valid quality.
- (b)** Candidates in the main used acrylic or a specific timber as the material for the frame. A few used templates to mark out the shape, others just drew freehand. Candidates used a range of tools for cutting out the shape from coping, scroll, jig saws to abra files. Some failed to cut out the centre piece of the frame, others failed to drill pilot holes before cutting. A lot of time was spent on filing and buffing rather than on details of manufacture. Wood was filed by most!
- (c)(i)** Most attempted to make the frame free standing by using some form of support at the back or adding a slotted base.
- (ii)** The hidden wall fixing system was sometimes not hidden, others just added nails or nails and string. The better answers used a keyhole slot or plate added to the back of the frame; some, however, inverted the slot.

Question 16

Very few candidates attempted this question, those that did chose turning or casting, which were not well answered. Only a very small number chose injection moulding, which was perhaps the most simple method.

- (b)** Casting tended to be resin poured into an open mould which was totally unsuitable for the given product due to its depth. A split metal mould or sand casting would have worked. Turning solutions depended on Centres: some produced quite detailed making processes and had obviously been taught to use a lathe, while others produced shallow limited answers. Injection moulding - Although only a few used this method, answers tended to be good with only slight details missing.
- (c)** Various finishes were suggested for the materials: lacquer, painting for wood, buffing to a bright finish for acrylic, enamel for copper, etc.
- (d)** There were quite a number of good ideas for holding the pens in place, extra base, slots, holes, etc.

Question 17

- (a) There were many almost correct answers for solvent bonding; however, a number applied the solvent after the two pieces had been set at right angles, it should be before. Not many used masking tape to protect the sides of the acrylic.
- (b) A large number of candidates set up the two copper pipes correctly but then tried to use a soldering iron to silver solder. There were some complete descriptions, using torch, flux, correct temp, etc, then they forgot to apply the silver solder.
- (c) There were some good answers to the mortise and tenon joint; however, some only used a pencil and ruler to mark it out. Cutting out the tenon was well explained, but the mortise was less well done.

Question 18

This was another very popular question.

- (a) Not always two methods of construction were given, mainly acrylic heat and bend. A few did suggest wood steam bending. Injection moulding was suggested with reasonable reasons for mass production.
- (b) Most did choose acrylic for the holder, but did not mark it out well. They mainly drew circles with a compass which was not needed. A few used a try square and ruler, centre lines, etc. Many used a hole saw to cut the hole but then went on to file it! Some even drilled a series of little holes and cut round with a coping saw. The shape was formed by using a strip heater or oven then bending over a former.
- (c) This simple problem caused some real difficulties for candidates, with many designing another egg holder for four eggs! The question was to design a holder for the four egg holders. The best answers suggested a central peg on which to store all four holders.

Paper 6043/02

Design Project

General comments

Candidates were able to interpret the theme **Interlocking** in a variety of ways and covered most of the focus areas suggested in the question paper.

Design folders were very well presented and generally set out well with a list of contents so that the different sections could be identified easily. This was very helpful to the Moderator.

However, candidates need to be reminded of the weighting of marks for each section of the assessment scheme so that the amount of time devoted to the corresponding section of the folder reflects the maximum marks available.

The assessment carried out by Centres was generally very consistent although, in some cases, marks required adjustment to bring them into line with the agreed standard.

Comments on individual assessment criteria

The Folio

General Analysis of Topic

The analysis of the theme should lead candidates to the selection and identification of a problem leading to their design brief. They should keep an open mind at this stage, consider a range of interpretations and be sensitive to possible design problems.

The analysis of Interlocking was very broad indeed and covered everything from the design of traditional houses and weaving to sculptures, modern weapons, mechanisms and a vast range of toys, games and furniture.

There was a tendency for some candidates to spend too much time on this section of their folders at the expense of other sections, particularly the Exploration of Ideas.

Design Brief and Specification

Few candidates were unable to write a clear design brief but specifications were often too general and could have applied to a whole range of problems. Candidates should take the opportunity to mention particular requirements of the brief and, where general specifications are given, they must be further qualified in relation to the particular design situation.

Exploration of Ideas

This is one of the most important sections of the folder where candidates have the opportunity to be as creative as possible, recording any ideas relating to their brief. There are no right or wrong answers at this stage and candidates should be encouraged to use informal drawing techniques to record their ideas. It is important that the design thinking is set out through the use of annotations.

Candidates who produce a good balance between drawings and relevant text centred on a range of whole solutions or part ideas can achieve good marks in this section. There were a few cases where candidates started to consider materials and constructions at this stage, which is too early for the award of marks.

Detailed Development of Proposed Solution

This section should make a significant contribution to the development of the overall design and as such is given a high mark weighting.

However, many folders contained very little true development focusing on ideas and part ideas identified in the previous section. Very often it was simply a repeat of information already seen and there was limited evidence of the consideration of alternative constructions, detailed shaping and materials. Where alternatives were given these often bore no relation to the particular design idea under consideration.

When alternatives are identified they should be annotated to give reasons for the final selection. This section should give the impression that the folder has been used as a tool to solve design problems.

There were some very clear and detailed working drawings.

Suitability of Chosen Materials and Constructions

Marks can be awarded in this section only where candidates have given valid reasons for their selection of materials and constructions in the development section of their folder.

Production Planning

Most candidates were able to give an outline sequence of events leading to the completion of the product. In some cases this was linked to particular dates or weeks.

Unfortunately, there were cases where this section was written as a record or diary of what had happened. In these cases candidates should not be awarded high marks.

Although candidates are encouraged to describe the more complex tasks and techniques in this section, there is no need to show simple tasks such as the marking out and preparation of materials.

Communication

The standard of drawing and other communication techniques was generally of a high standard and folders were easy to follow. However, some candidates should be congratulated on outstanding presentation skills showing both clear drawing methods and good use of colour.

The Artefact

Suitability of Proposed Solution

In some cases it was difficult to identify a clear link between the original brief and the final artefact. However, most artefacts appeared to function successfully and there was little evidence of unfinished products.

Workmanship

Many folders contained clear photographs of artefacts overall and most appeared to be well finished. Unfortunately there were others where this requirement of the examination was not fulfilled.

It is important that photographic evidence includes overall views and close up detail of all aspects of the construction and finish, for the purpose of external moderation.

There were examples of creative and innovative products indicating that candidates had gained much from their Design and Technology course.

Evaluation

Many candidates missed the opportunity to gain high marks in this section through a superficial approach to their evaluation and little evidence of testing. Reference should be made to the original specification and the product outcome should be critically appraised through objective comment.

A simple tick list of the specification points indicating whether or not, in the eye of the candidate, each has been met is not sufficient and cannot be awarded high marks.

Candidates should also be encouraged to record, with reasons, all modifications made during the construction alongside opportunity for further modification.