

# DESIGN AND TECHNOLOGY

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Paper 6043/01

Paper 1

## General Comments

The overall results this year show an improvement on last year, with some Centres getting outstanding results. A good example was **Question 11** on health and safety, which showed how well Centres are dealing with this subject matter. Candidates offered wide ranging knowledge about the dangers in a school workshop and what safety equipment was available to combat the problems. Another highlight this year is the way candidates are dealing with the process questions in **Part B**. Much more detail is being given when describing the stages of a process along side some really outstanding graphics. Most Centres now seem to have found a nice balance between the text and graphics in answering a question. Some candidates answered all the questions on the paper resulting in rubric errors.

## Details

### Part A

#### Question 1

Most candidates were able to name three processed timber boards with answers such as hardboard, plywood, chipboard, blockboard, laminboard, etc.

#### Question 2

Candidates were able give two reasons for using plastic for the artist's palette. Answers such as easy to clean paint from, waterproof, lightweight, etc. were given.

#### Question 3

Most candidates only able to name one of the two major metals in soft solder.

#### Question 4

Well answered by nearly all candidates with some excellent isometric drawings of the two joints.

#### Question 5

Not well answered by candidates with many thinking 'realisation' in design work was the taking of photographs of the final product, not that it was the final completion of the design and the start of the practical solution.

#### Question 6

A mixed response to this question, with some candidates giving both suitable plastics – melamine for the table top and polythene for the plastic bag, whilst others failed to name one.

#### Question 7

Well answered question by most candidates with answers such as length, gauge, material, type of head, slot, etc. Some candidates misread the question and gave responses about the situation in which the wood screws were to be used.

### Question 8

In the main well answered with most candidates giving Blow moulding as the process and heating as the action needed before bending.

### Question 9

Most answers referred to the need to reduce friction and prevent tools from breaking, etc.

### Question 10

The ball-pein hammer was well known, however many said it was used for nailing, when it should have been riveting. Only a few candidates able to identify the bossing mallet and its use.

## Part B

### Section 1 – Tools and Materials

#### Question 11

A well answered question by nearly all candidates who showed real understanding of health and safety issues.

- (a) (i) A wide variety of reasons given why materials cause breathing problems, from dust, fumes, particles, etc. The causes being mixing resin and catalyst, polishing, casting, etc.
- (ii) Again, a good range of reasons for materials causing eye problems with answers such as flying dirt, dust, particles from sanding, grinding, machining, welding, etc.
- (iii) Another wide range of reasons for skin problems was given with issues such as forging hot metal, using the acid bath, G.R.P work, etc. with problems such as burns, infections, cuts, etc.
- (b) Most candidates answered this well with items such as face mask, shield, goggles, gloves, apron, shoes, etc. given as types of protective clothing. All were given with valid reasons.
- (c) All candidates understood the dangers of badly maintained tools but the better candidates give real examples of typical situations.

#### Question 12

This question was not a well answered by candidates.

- (a) A mixed response to the tool question was given, with most able to identify the flat file, however many said it was for smoothing wood. Quite a number of candidates named the wrong chisel and called it a firmer chisel. Most candidates named the cold chisel correctly and its use.
- (b) This part proved more difficult with only a small number of candidates able to explain the reasons for the ferrule on the file, for example, to stop the handle from splitting.
- (c) Many answers in the section involved holding the tools in different positions not as asked in the question.

#### Question 13

This was quite a popular question and was well attempted by candidates.

- (a) All candidates seemed well able to reason the advantages and disadvantages of the three materials.
- (b) Well answered by most, with reasons such as waste of materials, time factor, fitting the puzzle together.

- (c) (i) Some outstanding sketches of the three tools needed were given. These ranged from dividers, compass, etc.
- (ii) A variety of tools were given such as woodworkers/engineers vice, g-cramp, etc.
- (iii) A variety of tools were given by candidates such as coping saw, fret saw, piercing saw, band saw, etc.

## Section 2 – Processes

### Question 14

This was a very popular question with candidates, again using their graphic skills to good effect.

- (a) All candidates were well able to give two properties for a material needed for the wash stand.
- (b) (i) Once again marking out proved to be a problem for some candidates, with some just using a pencil on its own. The best solutions used a pair of odd legs and work in from the sides to find the hole centres.  
  
The action of drilling the holes was very well explained, with a number drilling all three shelves clamped together.
- (ii) This section proved more difficult and only those who worked on the lathe had valid answers. It was not possible to produce the bar by hand. Although many missed the lathe work, some very good detail was given on the internal and external threading of the bar.

### Question 15

This was a very popular question with candidates, who tackled the making in a number of ways.

- (a) Quite a range of processes were suggested as the method of making the letter R.
- (b) This section was very well done and in the main, the chosen process was injection moulding or sand casting. Both methods gave candidates the chance to show of their knowledge and graphic skills of the stages in the production of the letter. A good example of this was the injection moulding process.
- (c) This was less well answered with mainly stickers offered as the solution. A few better solutions suggested a cut out template and spray painting the letter for the angled lines.

### Question 16

- (a) Most candidates were able to suggest a valid sheet material and give a reason for their choice. In the main this tended to acrylic or aluminium.
- (b) (i) The marking out process was not very well done by candidates, with many just suggesting a template and drawing around it. However, real detail of how this template was arrived at was not given.
- (ii) The cutting out was much better explained, with detail of cramping, support, saws used, etc. Again, good graphics added to the answers.
- (iii) Forming the bend was well done by most candidates, using simple stage by stage explanations such as heating, oven, strip heater, former, gloves, bending, cooling, etc.
- (c) The main suggestion for fixing the ends to the base tended to be screws or tensol cement. However, many answers just stated the word 'glue' with no other detail or information. The best responses used a brush application, cramped the work, cleaned the joint area, etc.

### Question 17

- (a) Hardening and tempering lacked full answers, with many candidates able to explain how to harden the screwdriver blade but lacked the knowledge about tempering.
- (b) Most candidates were able to explain plastic coating well; however, some thought the plastic was in liquid form not powder.
- (c) Quite well answered, with good detail of marking out the dovetail joint and cutting out the waste wood. Some candidates however used a coping saw for cutting all the straight line cuts. Also, a number of candidates cut the wrong parts away so that the joint would not work.

### Question 18

- (a) Quite a range of materials were suggested from gold to mild steel, from acrylic to pine. Reasons such as non tarnish, colour, weight, etc. were given.
- (b)(i) Many candidates described cutting the bangle body from tubing, but did not explain how the edges could be cleaned and straightened. Others worked from flat strips, softened and then bent, then joined by soldering or cement bonding depending on the material used.
- (ii) Drilling proved more difficult for most, unless they had drilled before bending. The bangle shape had to be supported or it would go out of shape when drilled.
- (c) A mixed range of materials suggested as inserts for the bangle such as acrylic, gold, diamond, glass, etc. were given, with all being glued in the holes. Better candidates suggested valid bonding solutions.

### Conclusion

This has been an outstanding year for Centres with examination results that show the hard work being put in by teachers to improve their standards. Candidates now break down the processes into understandable stages, with lots of relevant detail. The health and safety work question shows the real effort made to impress candidates of the dangers that are around in a workshop situation. The standard shown in the process section of the paper has improved; candidates now show such a wide range of knowledge across the syllabus. Drawings show real practical experience of tools, materials and equipment, with much fine detail.

One area for improvement is the Centre lathe work. Other processes such as injection moulding and sand casting continue to be well understood and used in the right situations.

# DESIGN AND TECHNOLOGY

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**Paper 6043/02**  
**Design Project**

## General Comments

The theme **family living** provided a wide range of opportunities for candidates to develop problem briefs. The majority of candidates found no difficulty in finding a problem area to develop and the theme provoked an appropriate volume of research at this stage. Many candidates sensibly looked at two or three areas before they went on to find a problem area they wished to pursue. Some candidates remained imprecise about what interested them and so their work tended to lack direction.

The published theme gave a number of possible ideas (threads) for the candidates to pursue. Many of the threads were designed to take a candidate forward at this stage. Some candidates only pursued one thread whilst other tackled several of the threads. It is not expected that candidates should exhaust every thread before they develop a design area further.

Sixteen threads were provided, very few candidates looked at re-cycling but many found design areas within pets and domestic animals, living and eating spaces and storage.

As in previous years a few excellent design briefs were inspired by a relative or friend who had a real live problem to solve. Where a candidate had identified a personal context in which to answer a design problem the work seemed to have more depth and detail in the folio.

Candidates provided a variety of responses to the theme and the range of artefacts included: display cabinet, table for a specific use, tray, item for pet amusement, games with various themes, presentation shelves, items for serving food and other items which responded to collections and the display of personal items.

## Comments on Individual Assessment Criteria

### **Part A – Design Folio**

#### **General analysis of the topic**

The published project theme sets out the level of teacher support and guidance which is appropriate under the section 'Notes to Teachers'. In line with the advice given in previous annual reports an increasing number of Centres clearly help candidates identify the amount of time available on a weekly basis and at the beginning of the project set out a time related plan. Most Centres now support candidates sufficiently to allow them to independently identify a design brief which is within the scope of the theme, within their making capabilities and the facilities available. This approach provides professional guidance at the early stages of the design process and so ensures the candidate will not fail because they have not been realistic about the scope of the overall project.

#### **Formulation of Brief and Specification**

Most candidates identified a design brief which focused on a specific problem to be developed. Design briefs were generally clear and to the point, only a few candidates made general statements about producing 'something' to solve a problem.

Specification points need to be specific to the context of the problem being developed. Specification points which remain general, for example, 'must be safe', 'must be stable' do not provide an adequate basis for evaluating the artefact once it has been manufactured.

## **Exploration of ideas**

In general, this section is completed well by candidates; the sketches and notes display a good understanding of the problem area. Better responses included evaluative comments and thoughts which not only add value to the ideas section but also can, if clearly labelled as evaluation comments, contribute to the overall evaluation.

## **Development of proposed solution**

Some candidates made such a comprehensive response in the ideas section that they had no further refinements to add for the development section. However, this can make marking more complex and therefore it would be helpful if candidates ensured they developed the chosen idea in this section of the folder.

Development of the proposed idea ranged from a simple final drawing to a step by step analysis of the idea being developed. No formal drawing is demanded in this section, but where candidates used orthographic or a pictorial view of the proposed artefact, the work often gained high credit.

## **Suitability of chosen materials and construction**

Folders which made no reference anywhere in the project folder to materials and construction techniques scored low credit in this section. Better folders used a specific page/s to set out their decisions about the reasoned choice of materials and the reasons for choosing joints or approaches to the construction of the artefact.

## **Production Planning**

This is an important stage of the pre-manufacturing process. Many candidates used pictures to augment the step by step process chart which is required for this section of marks. Photographs were used to good effect in this section.

## **Communication**

In this section maximum marks were awarded to folders which displayed an approach which brought together visually informative, colourful and, where appropriate, annotated sketches, charts and diagrams. Many Centres now use computer software to enhance the design work of candidates. Excessive use of CAD packages should be avoided so that candidates can also reveal their own hand skills in visually presenting ideas, sketching and making more formal drawings.

## ***The Artefact***

### **Suitability of Proposed Solution**

Some Centres had judged their candidates to have comprehensively fulfilled the expectations of the specification and as a consequence awarded maximum marks in this section. Very little differentiation was evident in the awarding of the marks. Marks awarded in this section should not be confused with the quality of the workmanship or how dedicated or successful the candidate had been in making the artefact.

### **Workmanship**

As is usual in this examination, the quality of the workmanship was very high. The work reflects the confidence candidates have in their practical skills at this stage of the design process. Where a candidate completed the artefact the evaluation usually was more comprehensive.

It is important that every folder contains a good quality photograph/s of the finished artefact; this allows the Moderation process to judge the detail of the finished artefact and so confirm the marks awarded by the Centre for the quality of the work.

## **Evaluation**

The better evaluations incorporated the following areas:

Judgement of performance against the specification points;

Testing the artefact in the context of use;

Suggestions for modification of the artefact.