DESIGN AND TECHNOLOGY

Paper 6043/01

Paper 1

General Comments

This year the performance of candidates was very much in line with last year's improved standard, with many candidates showing excellent drawing and graphic skills in answer to the set questions. However a number of candidates failed to read questions correctly, spending a great deal of time and energy giving completely wrong answers to questions of their own making. Section A once again proved to be a good starting point for candidates with some high scores recorded. **Question 11** however proved to be difficult for many candidates who showed very limited knowledge of boring tools.

Details

Part A

Question 1

The majority of candidates were able to give two methods of seasoning, natural/air and kiln.

Question 2

This proved to be a more difficult question for some candidates who failed to identify the two items or their purpose.

Better candidates easily gave die holder and split die, with cutting threads as the purpose.

Question 3

In the main, correct explanations were given for 'plastic memory', with the acrylic able to return to its original shape if heated.

Question 4

A wide range of answers to this question with paint, wax, oil and water stains, etc. given as a means of colouring the wood.

Question 5

Most candidates were able to give some reason for a designer carrying out market research, but many failed to give more than one. Once again, better candidates gave a range of answers such as looking at existing products, styles, costs, materials, functions, etc.

Question 6

Part **(b)** was very well answered with most candidates able to sketch a centre punch. However, in part **(a)** the nail punch proved more difficult, with many just drawing a dot punch.

Question 7

Quite a well answered question, with most naming 'acrylic' as a suitable plastic for the spoon, with range of reasons including colour, hygiene, lightweight, non-toxic and ease of cleaning.

Question 8

Not very well answered, with many candidates suggesting it was to prevent rust.

Question 9

This was very well answered with excellent sketching of the dowelled and mitre joints.

Question 10

Most candidates understood that the fault was caused by poor joining of the two parts of the mould, but could not name the surplus material that resulted from the problem – 'flash'.

Part B

***Section 1 – Tools and Materials*.**

Question 11

This question was not answered well.

(a) Most candidates were unable to identify the three tools-
A – combination centre drill
B – flat drill
C – hole saw.

Once again it showed a lack of knowledge of lathe work and the purpose of a centre drill. Some did name the flat drill but failed to give a reason for its use. All seemed to have some understanding of a hole saw.

(b) (i) There were few correct answers on how the centre drill is used.

(ii) Again, there were few correct answers on the dangers of using a flat drill.

(iii) Quite a few correct answers were given, stating that the waste material gets lodged inside the cutter.

(c) Very few candidates were able to give correct sketches of a morse taper shank on a large drill.

Question 12

Only a few candidates attempted this question.

(a) Most were able to identify materials to be joined by the different mediums but had more problems giving particular advantages for each.

P.V.A. adhesive was given as mainly joining wood to wood, although some did suggest expanded polystyrene which was also correct.

Epoxy resin adhesive was given as joining almost everything which was correct.

Tensol cement given as joining acrylic plastic which again was correct.

Brazing spelter caused the most problems for candidates, who in the main failed to give the correct answer of ferrous metals.

Contact or impact adhesive prompted some very odd answers, one being that it is considered to be a wood to wood joining material.

(b) Most candidates were able to give two valid qualities that surfaces should have before joining with an adhesive, cement, etc. These included flat, clean, smooth, close fitting, etc.

Question 13

The most popular question on the paper with candidates scoring very well.

(a) Quite a good response to this section with most able to give a valid reason for selecting each material but then having more difficulties suggesting reasons for rejecting.

Aluminium was given as lightweight, quite strong, non rust, easy to work. However it could bend easily, have sharp corners and edges, etc.

Birch plywood was given as very lightweight, quite strong, can be painted or stained, easy to work. but not waterproof, may decay, may splinter, etc.

Nylon was given as very lightweight, strong, tough and waterproof.
However it may flex at this thickness, holes may be undersize, etc.

(b) (i) Some excellent drawings of the holding system, mainly using a g-cramp and waste wood for support and protection. A few used a machine vice but failed to give it support.

(ii) Most candidates suggested a bench vice with waste support and a limited amount of material projecting from it. Some suggested holding the work on a bench surface with the cut section overhanging the edge.

Again some very good sketching.

(c) Most candidates suggested that the plate should be attached to the display boards with screws. However, many had poor second ideas of using nails or glue. The higher grade candidates also suggested using nuts and bolts, some suggesting wing nuts and threaded rods.

Section 2 - Processes

Question 14

Not such a popular question with candidates.

(a) Most candidates were well able to suggest a material for the box and give a valid reason. The materials suggested ranged from teak, beech, aluminium, brass, acrylic, polythene, etc., all of which would have been suitable. Reasons given included colour, strength, finish, etc.

(b) There were some very good descriptions and sketching of the injection moulding process which most candidates suggested for making the jewellery box base. A few candidates suggested turning the base on a centre lathe but had problems when it came to cutting the inside of the box. Another method suggested was vacuum forming but this would have had major problems due to the shape of the box.

(c) This was well answered with some good ideas for the letter design on top of the box.

(d) Perhaps the weakest part of the question for candidates who failed to give real details of applying the design to the box. Many tried to paint acrylic or carve it.

Question 15

A very popular question.

(a) All who attempted this question seemed able to identify and explain the potential dangers with the see-saw.

Mild steel handle – was broken and would have sharp edges potentially leading to cut hands, and would prove unstable in use.

Pine board – was splitting at the ends, risking splinters, trapped fingers, etc.

Mild steel spindle – no nut or washer so may cut legs, fingers, etc.

Screwed joint – screws coming loose may catch feet, legs ,etc. Others said that the joint may fail and the see-saw collapse.

Bolts – some bolts seemed to be missing from the base and the see-saw may break loose causing injury.

pvc cover – has broken away in places and may cause seating injuries.

(b) This section proved a little more difficult for candidates.

Mild steel handle – most candidates just suggested replacing the broken handle, with no improvements. Others suggest adding rubber grips, a new material, while the better candidates designed a totally new, stronger design.

Pine board – few had any ideas about this problem other than using another material. The ends of the board could have been banded with a metal or wood strip to prevent splitting.

Mild steel spindle – most suggested just cutting off the part that projected from the sides, this would not solve the problem as it would in time come loose. The better ideas used lock nuts and washers or cap head nuts.

Screwed joint – most suggested re-screwing with longer or more screws. Some redesigned the joint for greater strength.

Bolts – most replaced the missing bolts, however some suggested a better holding method such as sinking the support system in the ground or concrete.

pvc cover – in the main most just replaced the poor system given, the better candidates redesigned the seat, gave it a back rest and used stronger materials.

(c) Most candidates able to give two valid methods of protecting the pine board – paint, tar oils, varnish, water soluble chemicals, wax, etc.

Question 16

Another very popular question

(a) A wide range of suitable sheet materials were suggested for the tool holder such as mild steel, aluminium, beech veneers, acrylic, polypropylene, etc. with reasons given such as easy to form shape, strength, colour, weather-proof, etc.

(b) Not very well answered by candidates.

(i) Much of the detail given by candidates for cutting out the outline was vague and limited. For example many just stated ‘cut with a hacksaw’. Nothing was explained about holding and supporting the work, how other more difficult cuts could be made, tools named, smoothing cut edges, etc.

(ii) This section was explained in much more detail with acrylic as the chosen material. Most used the strip heater method and formers to complete the bending, with a few suggesting aluminium, a mallet and former.

(iii) Not very well explained with few having any real idea of how to give acrylic a final finish. Once again, a few suggested painting the surface.

Question 17

Quite a popular question

(a) In the main well answered with most candidates able to give one valid reason for the materials suggested.

Birch plywood – flat, smooth surface, clean, fresh, large sheet sizes.

Mild steel tube – very strong, easy to work, lightweight.

Polythene coating – not that well answered with few understanding its use which should have been to give added colour, protection against water, warm to the touch.

Rubber – most candidates suggested correctly it was to prevent the table from slipping.

(b) (i) Some good attempts at joining the rail to the table top, again with high grade graphics. The system used was mainly screws and glue, although a few just nailed.

(ii) Most drilled holes for the slot but then had problems cutting it out in a tube situation.

(c) A limited response to this design problem with many just giving a peg and hole system. The better candidates used a threaded system with larger shank and good hand gripping device.

Question 18

Again a very popular question with candidates.

(a) All candidates well able to give three valid safety features for the toy which included – no loose or small parts, lightweight, non-toxic, no sharp edges, tough, etc.

(b) All three processes attempted with the built up method being the poorest answered.

(i) Those who chose injection moulding produced clear details of the system and gained high marks. Some candidates got a little confused and had a mould system which simply involved pouring hot liquid plastic.

(ii) Those who opted for the cast method did very well and gave great detail of the split pattern, boxes, tools and materials involved.

(iii) The candidates who attempted the built up method tended to use three ready made pieces which were then nailed together. Others tried to cut the shape from a solid block with little detail or information.

(c) The solutions offered to this problem mostly consisted of a simple spring joining the head of the toy to the body, however no detail was given on how this was fixed. The best solutions used a cam fixed to the axle with the rod resting on it, so as the axle turned so the rod and head moved up or down.

Conclusion

Another large entry for the subject, with the standard slightly better than last year. The sketching and graphics remain at a good level and add greatly to the candidates ability to explain answers. It was pleasing to see some improvement in the area of processes, with injection moulding and metal casting very well described. One area of weakness this year seemed to be hand and machine tools. **Questions 2, 6, 11** all related to tools and caused candidates major problems. Even when answering some of the process questions candidates failed to identify and use the correct tool. A hacksaw is not for cutting wood, and you do not centre punch acrylic plastic. Practical workshop experience should be the base on which other technical knowledge should be built. It also seems that the lathe and its tools still remains a mystery for some candidates in Centres.

DESIGN AND TECHNOLOGY

Paper 6043/02
Design Project

General comments

Candidates interpreted the theme **Improving and Modifying Products** in a variety of ways and interesting outcomes included: school lunch box; computer chair; animal trap; key storage; rocking chair; candle holder; desk tidy; mobile phone stand; test tube rack; remote control holder; drawing aids; torch kit; clock and a variety of household storage systems.

The majority of design folders were set out well and tended to follow the order of the assessment criteria. This together with an accurate list of contents helped the process of moderation.

Most candidates had clearly become very involved and interested in their Design and Technology Project resulting in some work of an extremely high standard.

Comments on Individual Assessment Criteria

The Folio

General Analysis of Topic

Generally, candidates made a thorough analysis of the theme and this resulted in a range of potential design problems in most cases. Candidates seemed to have few problems linking the theme to their own experiences and this gave the work more meaning.

Design Brief and Specification

Most candidates wrote a clear brief and this left no doubt in the reader's mind as to the direction of the project. It is pleasing to report that specifications are becoming more focused with sound qualifications and there are fewer cases of generic statements being used such as ' Must look good.'

Exploration of Ideas

Most candidates had a good balance between sketches and annotation with ideas containing appropriate detail so that the design thinking could be followed. Some candidates were very creative indeed, giving themselves the opportunity to consider a whole range of different design ideas. These candidates deserve to be congratulated on the quality and variety of their ideas.

Detailed Development of Proposed Solution

There were some very good examples of candidates considering all aspects of form, materials and constructions in the development of their chosen idea. These choices were supported by sound reasoning, indicating that candidates had a good knowledge and understanding of those aspects of Design and Technology.

This section should conclude with some form of working drawings from which a skilled person could make the artefact.

Suitability of Chosen Materials and Constructions.

High marks can be awarded in this section only where candidates have given sound reasons for their choice of materials and constructions in the previous section.

Production Planning

There is no need for candidates to describe in detail the basic stages of manufacture such as marking out and preparation of materials. However, they should set out the more complex tasks or any processes that are new to them.

This should be alongside an overall sequence plan so the order of important stages is clearly set out. In some cases this was linked to specific dates and indicated where the schedule had not been met.

Communication

The standard of drawing and other communication techniques was very high indeed and folders were generally neat and easy to follow. Candidates had clearly paid particular attention to this aspect of their work and should be congratulated on the successful outcomes.

The Artefact

Suitability of Proposed Solution

Most artefacts appeared to function successfully and there were few examples of unfinished work. It is important that Centres use the full range of marks where appropriate so that fair discrimination between candidates can be maintained.

Workmanship

There were examples of some very high quality products indeed, indicating that many candidates have developed sound making skills. It is reassuring to see that candidates can be discerning in this respect so that outcomes are well finished and operate as intended.

Some products were indeed innovative, indicating that these candidates had achieved much from their Design and Technology course of study

Photographic evidence of artefacts was as required by CIE and this was very helpful to the Moderator.

Evaluation

As has been observed before, this section of design folders continues to improve indicating that candidates now have a better understanding of the importance of real testing leading to meaningful evaluation. Most evaluations took account of the original design specification and these were considered carefully and given objective comment.

Where candidates observed faults in their designs then modifications or alternative approaches were normally suggested.