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FOREWORD

This booklet contains reports written by Examiners on the work of candidates in certain papers. **Its contents are primarily for the information of the subject teachers concerned**.

DESIGN AND TECHNOLOGY

GCE Ordinary Level

Paper 6043/01

Paper 1

General comments

Once again the number of candidates taking the examination has increased, with some Centres entering for the first time. The general performance of candidates was very much in line with last year.

Higher-grade candidates showing sound knowledge of materials, tools and processes, along with excellent technical sketching skills.

Less able candidates once again tended to use general terms such as 'cut', 'bend', 'plastic', etc., for detailed answers. Some of these candidates failed to read **Question 13** properly, in part **(b)** it asked them to name and sketch the tools or equipment needed to cut and bend the bookend. Many wasted time and effort by giving a long drawn out explanation of making the whole bookend, from the marking out to the final surface finish. While doing this they failed to sketch the required tools.

Quite a number of Centres are still allowing their candidates to answer questions on separate drawing sheets. The lined paper provided is best for both text and drawings, it means the candidate does not waste time or get confused. This year it has proved extremely difficult for the marker to follow the candidate's train of thought and find the whole answer to a question.

Comments on specific questions

Section A

Question 1

Quite well answered by most candidates with the following reasons given for rejection of a piece of timber – twisted, bent, split, knots, worm holes, poor seasoning, etc. However, some thought that size had a part to play!

Question 2

Most candidates were able to sketch a tenon saw but then had problems giving the reasons for the weighted back. Should have been to add weight to the blade, keeping the blade straight, accurate cutting, etc.

Question 3

Very mixed response to this question with many naming the wrong material for **(a)** the go-kart frame, aluminium, copper, acrylic, etc. The answer should have been mild steel. Part **(b)** was better answered with a wide range of materials such as concrete, bronze, resin, cast iron, etc.

Question 4

Very well answered by nearly everyone, giving the following:

(a) Compression moulding and fluidising.

(b) Vacuum forming, blow moulding, press, curvature, etc.

(c) Injection moulding and extrusion.

Question 5

Another very well answered question with most candidates well able to identify the three personal hazards. The most popular answers being long hair, jewellery, scarf, ties, long sleeves, soft shoes, being caught in machines, falling objects, etc.

Question 6

Once again a mixed response to this two part question. All seemed able to understand the need for soluble oil when drilling – to prevent overheating of tool/work, wash chips, etc. Few however, understood the need for flux, with many suggesting it increased the strength of a metal. The correct answer being preventing oxides from forming, break down surface tension, etc.

Question 7

Most candidates were able to give one reason for using expanded polystyrene but not two. Answers ranged from good insulator, retains heat, lightweight, non-toxic, cheap throw away, etc.

Question 8

In the main well answered, with most candidates able to show an understanding of the term 'prototype', the first practical design solution that will be tested to the limit to show failings.

Question 9

Another well answered question with most able to provide three possible surface finishes for the timber – painting, varnish, wax, oil, French polish, etc.

Question 10

Not well answered, many candidates named files as a final method of removing scratches from acrylic, then suggested painting the surface. The better candidates suggested a scraper or wet and dry paper, followed by abrasive polish or machine buffing.

Section B

Question 11

Not a popular question with candidates.

(a) A few correct answers but in the main most candidates that attempted this question seemed unable to identify the three given devices. The staple (c) gained the most correct answers, but (a) the simple dowel and (b) the split pin seemed to be outside the experience of candidates.

(b) This part of the question was well answered, with the differences between temporary and permanent fixings well explained. Such things as easily removed, dismantled, etc., with devices named screws, bolts, etc. for temporary methods, then unable to be taken apart with nailed, glued, welded, etc. for permanent methods.

Question 12

Quite a popular question, that was well attempted by most candidates. Part **(c)** was the only section to give problems.

Some candidates did get a little mixed up by giving the answer to part **(b)**, the special protection/equipment in answer to part **(a)**.

(a) Very well answered with the following hazards being given for the three problem areas.

(i) Particles of dust and grit getting in eyes, causing breathing problems, etc.

(ii) Handling strand glass, resin, toxic fumes, etc., causing skin and breathing problems.

(iii) Sharp waste materials, chips, swarf, flying from machine, etc., causing skin and eye problems.

(b) Once again good answers to this part.

(i) Solutions offered – dust mask, face shield, goggles, etc.

(ii) Solutions offered –rubber gloves, face mask, etc.

(iii) Solutions offered – chuck guard, face shield, swarf tool, goggles.

(c) This was the weak area for most candidates who in the main tried to turn the question into one about tools. The better candidates offered answers such as; incorrect stacking of materials, keeping certain chemicals together, fire hazards, fumes, etc.

Question 13

The most popular question in the examination, however, as stated in the introduction quite a few candidates turned it into a process question and not as asked – a tool question.

(a) Most candidates were able to name a suitable material in each of the groups stated and give valid reasons for its use.

The less able candidates just used the general terms given – wood, metal, plastic and tried to give a reason for their use.

(b) Only successful for the very best candidates, who identified and sketched the coping saw, piercing saw, abrafile saw, etc., along with the folding bar, vice, strip heater, etc.

(c) This part was well answered with some good detailed sketches of the bookend supported on waste, clamped to the drilling table with additional scrap protection.

Question 14

Another very popular question with some excellent solutions, highlighted by good quality drawings.

(a) Most candidates were able to give the stages of making a mortise and tenon joint. A few used the wrong gauge (marking) and also failed to mention how the work was held while being worked.

(b) This part was answered less well, with many candidates suggesting using a brush for applying contact adhesive, then only coating one surface. Better candidates identified preparing the surfaces, comb tool, leaving to dry, etc.

(c) Some excellent answers to this part with candidates showing real detailed knowledge of the riveting process. A few however, tried to turn the question into pop riveting!

Question 15

Quite a popular question.

(a) Most were able to identify suitable materials for the three parts of the musical chime frame. Aluminium, copper, mild steel, stainless steel were all suggested for the chimes with the reason of providing the best sound quality.

(b) A very mixed response to this part with some limited solutions at times.

(i) Simple answers just drilled holes and glued the spacing bars, better answers provided some form of location by turning down the ends of the bars. Less able candidates tended to just nail the end support to the spacing bar, which would have caused out of line problems.

(ii) Many candidates drilled a diameter 25 hole in a vertically held chime. The question asked for the drilling and cutting of the slots which required a horizontal holding position. Those that did answer correctly used a hacksaw, coping saw, abrafile saw to cut the slot once drilled. Few used vee blocks or vee grooved jaws for holding the round material.

(iii) In the main, the solutions offered for suspending the chimes tended to be two drilled holes in the sides of the chime and a hole in the spacing bar joined by nylon cord or wire. A few candidates tried to solder wire.

Question 16

Not a popular question but a wide variety of responses, from the outstanding to very poor. Most candidates chose to answer parts **(b)** and **(c)**.

(a) Only a few attempted to answer this part, with candidates trying to hold the nylon blank between centres rather than in a three jaw chuck. Then they tried to drill the blank in a vice, in a vertical position. In the main it showed very poor understanding of the centre lathe.

(b) Very well done by the best candidates who provided real detailed stages of casting the aluminium bearing holder.

(c) The finger joint was less well done with many answers lacking details about tools, methods of holding, etc.

Question 17

Quite popular with candidates.

(a) Some very mixed answers to this part of naming two methods of construction – the best giving press forming, heat bending, lamination, steam bending, vacuum forming, along with valid reasons. Poor answers included casting, compression, etc.

(b) Vacuum forming with acrylic was the most popular process chosen, which candidates did well to explain. A few tried to use a strip heater as a method, however, this would have had very limited success in forming the given shape.

(c) Very poorly done by nearly everyone. Few had any idea how to finish the CD holder. Most had chosen acrylic as the material but wanted to clean it with sandpaper, then paint the surface!

Question 18

This again was quite popular with candidates.

(a) No major problems in naming two suitable properties for the toy. These ranged from non-toxic, lightweight, warm touch, etc.

(b)(i) The hand process tended to be a description of cutting the toy from a solid wooden block. Lack of detail tended to let some candidates down who failed to explain how work was set up for cutting, etc.

(ii) The industrial process tended to be injection moulding which in the main was quite well done. Some candidates produced quite detailed drawings of the injection moulder, with all its relevant parts and workings. Less able candidates just resorted to using a jig saw and cutting out a solid block again.

Final comments

Candidates have obviously worked hard, with many showing real practical experience of tools, materials and processes. One thing that stands out this year is the high standard of performance that some candidates are now reaching. These Centres can be justly proud of their candidates and what they are achieving.

Examiners would, however, like to remind other Centres again that allowing candidates to answer questions on drawing paper and lined paper, wastes not only their limited time but might hide the candidates thought processes.

Examiners would also like to suggest that Centres remind candidates to take the time to read the question paper correctly. It is time well spent with less wrong answers, less rubric errors, and in the end higher marks.

Paper 6043/02
Design Project

General comments

Candidates were able to interpret the theme *Leisure* in a variety of ways and considered many of the focus areas suggested in the question paper.

Some candidates had clearly given a considerable amount of time and attention to their work and should be congratulated on the quality of both the ***Design folio*** and the ***Artefact***.

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

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 *Leisure* by most candidates was very broad indeed and covered all types of activity that fall into this topic. As might be expected of young people many candidates focused on their own hobbies and sporting activities. Products included: tennis ball retriever; fishing rod; fishing rod holder; pool cue case; children's games; electric guitar; picnic table and other equipment linked to eating in the open.

Unfortunately, there were still a few cases where candidates started to consider materials, components and constructions as part of their analysis of the topic. Very often this was simply information taken directly from textbooks and, as such and at this stage, cannot be considered for the award of marks. Consideration of these items should appear in the **Detailed development**.

There is still a tendency for 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 sometimes 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.

On the other hand a specification should not be so detailed that it starts to solve the design problem. The list of specifications should set out the requirements for the final product, whatever form it might take.

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.

Some candidates made use of computer graphics packages for their drawings in this section but the Moderator is not convinced that this is always the best way of showing ideas as they come to mind.

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.

Detailed development of proposed solution

This section makes a significant contribution to the development of the overall design solution 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 and making problems.

It was encouraging to see that candidates had made good use of a variety of modelling techniques and 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 given 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 still a few cases where this section had been written as a record or diary of what had already happened. In these cases candidates cannot be awarded high marks.

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

Communication

The standard of drawing and other communication techniques was generally very high indeed and most folders were easy to follow. 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

Unfortunately, in a few 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 work. Centres are encouraged to use the full range of marks when assessing candidates under this criterion so that true and fair discrimination can be achieved.

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

This section of design continues to improve and it is obvious that most candidates are now seeing this as an important part of the design process.

However, some 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. Where this technique is used there should be further comment giving reasons why the specification point has, or has not, been met.

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