

Moderators' Report/
Principal Moderator Feedback

Summer 2012

GCE Design & Technology (6RM01)
Paper 01 Portfolio of Creative Skills

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Principal Moderator's Report on 6RM01

Resistant Materials Technology 2012

It is pleasing to report that candidates appeared to have an improved grasp of the requirements of the specification, which led to an overall better performance in the work seen and more accurate assessment of candidate work by centres. However, there are some formulaic approaches to work that can be easily recognised by Product investigation and Making tasks that are identical year on year which may not help candidates achieve their full potential.

Product investigation

Most candidates scored significant marks in this section as centres continue to improve their understanding of assessment requirements. Where centres shared too few products across their cohort, the inevitable consequence was that differentiation was difficult to identify, and equally, it was increasingly difficult for the most able to demonstrate their knowledge and understanding. In such cases the work tended to be very descriptive and teacher driven which defeats the educational rationale of an investigation.

Criterion A - Performance analysis

Most candidates achieved well in this criterion especially when their work was well structured under appropriate sub headings. There is a better understanding now, that candidates should place themselves in the mindset of a designer setting out to design the product under investigation before it has been produced and consider issues of Form, Function, User requirements, Performance requirements etc. and to make specification statements that are technical, measurable and justified. User requirements and Performance requirements are sub-headings that offer opportunities to consider the most technical and performance related issues of a product, but only the most able candidates recognised their importance by recording several points under each heading. A minority of candidates produced superficial and inappropriate statements under Performance requirements such as "it should look good" or "it must appeal to users", statements that seem to imply that very little guidance or teaching had been in evidence.

Some candidates failed to present photographic images of their chosen product, which made it very difficult to appreciate the analysis and some selected products from internet websites, which placed them at a distinct disadvantage in not being able to handle or disassemble the product.

Despite feedback from moderator reports to centres and repeated advice and guidance in Principal Moderator reports, centres are still allowing candidates to select 'similar products' to compare and contrast that are 'too similar'. Two computer mice made from the same materials, two electric food mixers or two pencil sharpeners that are very similar offer little opportunity to compare and contrast against each other, leading to very similar or identical statements under specification headings. Better pairings may have been a computer mouse and graphics tablet (both input devices), an electric food mixer and a hand whisk and a small throwaway pencil sharpener and an electric desktop sharpener, all of which have different form, function user/performance requirements etc. and offer lots of opportunity for comparison.

It is unfortunate that many candidates were directed to investigate the same product which resulted in replication of information and difficulties in determining individuality of presentation. Investigating the same product is limiting and counter to the intended reasoning behind this element of the course. The intended action of each candidate, individually investigating different products was meant to develop discussion, interest and learning among peers who would

experience different products manufactured using diverse materials and processes and this would add relevance and cohesion to their Unit 2 studies.

Criterion B – Materials and components

The vast majority of candidates were able to identify two materials that their chosen product was made from. They were able to list advantages and disadvantages of the selected materials, usually by listing properties, but most failed to relate the listed properties to the needs of the product.

It is becoming clear that many candidates are simply using this assessment section to record any and all information they know regarding the identified materials, when what is required is a demonstration of their ability to match selected properties to product design needs. Most candidates were able to suggest alternative materials that were appropriate for use in the product, but many specified those that were very similar to the original, such as ABS and HIPS, which does not show a very broad knowledge and understanding of materials and their properties

Consideration of the environmental impact of using the materials identified was a problem for many candidates, with many just addressing end of life issues rather than extraction, processing, refining and disposal. Sustainability was often the focus rather than environmental impact.

Criterion C – Manufacture

The great majority of candidates were able to identify two appropriate manufacturing processes used in their product. They gave advantages and disadvantages of the identified processes, but very often failed to link these to the needs of the product. The majority of candidates were able to identify an appropriate alternative to one of the two originally identified processes, but a surprising number named ones that were inappropriate, particularly when dealing with plastics moulding. It was very common to see blow moulding given as an alternative to injection moulding or rotational moulding as an alternative to vacuum forming.

Where there is no real alternative to a process such as injection moulding it is acceptable for candidates to suggest a process that would be appropriate if a different material were used, as long as they name the material.

The environmental impact of using the processes identified was not well done. As with the previous assessment section much of the evidence seen was generic and failed to focus on the effects of using the identified manufacturing processes.

Criterion D – Quality

Few candidates scored maximum marks in this assessment section although many were able to secure at least half marks recording appropriate quality control checks. Many more candidates identified quality checks, which were generic and did not focus on the product or component parts of the product under investigation. Some candidates simply described what QC was without specifying checks linked to their product.

The understanding of quality assurance is improving but there are still a significant number of candidates unaware of requirements, resulting in general explanations of QA and confusion with QC. Many candidates were able to present quality assurance systems, but these did not usually focus on the product. What is required under 'Quality assurance' could be presented in the form of a flow chart for example, using such sub headings as Preparation; Processing; Assembly; Finishing and After-sales.

The majority of candidates ignored the requirement to identify and explain appropriate quality standards and where standards were identified there was often no explanation to say how they would influence the manufacture of the product. Some candidates stated that they could not

find any relevant standards to discuss, which may well be the case in terms of manufacturing processes, but regulations such as the ISO 9000, ISO 14000 series and the 1974 Health and Safety at Work etc. Act can all be used as appropriate standards, provided that a candidate can explain how they would affect manufacture of the product under investigation. This assessment criterion is included so that candidates realise that companies cannot produce goods without complying with controls.

Product design

As in all previous years in the life of this specification this was the most disappointing part of the portfolio of creative skills, where candidates failed to gain marks because of a lack of understanding of requirements and in many cases limited designing skills. It would appear from the evidence presented that many candidates were left alone to produce design work with little teacher intervention to guide and teach design and presentation techniques.

Criterion E - Design and development

In the case of the most able candidates some excellent work was seen, but this was the exception rather than the rule. Only a few candidates demonstrated high levels of creativity, flair and knowledge and understanding of materials and processes in their work and while it is expected that a range of abilities would be seen, there were many more instances of mediocre work than those of quality. Designs were often limited to concept shapes accompanied by superficial annotation and initial ideas often jumped straight to a final design without showing any evidence of progression as work evolved.

Most candidates produced a range of ideas, but with many, the first idea related to the task in hand while others bore little relevance to it at all. Reference to design criteria was not well considered and in many instances candidates presented no design criteria, or it was as superficial as to be useless in reviewing designs as they progressed. It is essential, if candidates are to target high marks, that the Product design section begins with a design brief that contains measurable design criteria that can be used to review design ideas against and to evaluate the final design proposal.

In order to guide designs and to enable their realistic evaluation, design criteria must be measurable in design terms, as the designed product is not likely to be made. Criteria statements regarding load-bearing cannot easily be tested without making the design, and comfort levels of seating cannot be judged without the physical presence of the product, but seating sizes to accommodate a specific number of people can be evaluated by using anthropometric data and ensuring a product is waterproof can be evaluated by naming materials that are known to be weather resistant.

Many candidates appeared not to understand the requirements of this assessment section, failing to present a range of alternative design ideas that were explored in detail graphically and annotated with information on materials and processes that might have been used were designs taken through to manufacture.

Marks are gained for details of sub-systems of design ideas to show how mechanisms work, drawers slide, parts rotate and so on, but the majority of candidates relied on annotation to label details, without showing how they would be achieved.

In developing ideas towards a final design proposal, some excellent work was seen, but it was obvious that many candidates and centres still struggle to appreciate what is expected in terms of development. Development means 'change', and this should involve the bringing together of the best and most appropriate features of design ideas into a final refined design proposal that meets the requirements of the design criteria. There should be evidence of further design input into the developed design through the results of evaluation against design criteria. It is not acceptable to simply take an initial idea and make superficial or cosmetic changes to it and then present it as a final developed proposal.

Modelling to test design features is an important part of development and this was evident in most design folios, and some was of excellent quality. Unfortunately for many, modelling actually served no purpose and opportunities were missed. In such instances any suggestion as to what candidates were trying to resolve was missing and no conclusions were drawn. For a few the quality of modelling was so poor that there was no way in which it could inform or enhance the design process at all. There should be reasons for modelling, which may include testing features such as proportions, scale, mechanical details, sub-systems etc.

As a result of development, most candidates were able to produce a final design proposal that included some technical details of materials, processes, techniques, fixtures and fittings that would be used during product manufacture, but not many objectively evaluated the proposal against set design criteria.

The Product design section continues to cause problems for many candidates who are not accessing the large pool of marks effectively. It is likely that more teacher input in design teaching and in ensuring candidates is familiar with assessment requirements would result in significant improvements here.

Criterion F – Communicate

As was the case last year, most candidates achieved significant marks in this section and some displayed excellent standards of all-round communication skills. The use of CAD was generally of high quality, but dimensioning of CAD drawing tended to be problematic. Where this aspect was generated within the CAD software many dimensions were inappropriate, extending to three decimal places and of no practical value to a third party intending to manufacture the design proposal.

While many candidates received good credit for using a range of communication techniques with some skill, the level of free-hand sketching was generally poor and often consisted of no more than simplistic images that conveyed little detail. Some candidates used 3D CAD to produce design ideas, but these lacked the spontaneity, detail and flow of hand drawn sketches. A common failing in this section was the lack of detailed information offered to enable third party construction of the intended product. The production of a detailed and dimensioned working drawing of some kind, a cutting list and suggested processes would help many candidates to achieve higher levels of response in this assessment section.

Product manufacture

Despite a lot of good quality work being seen, there was a lack of demand in a number of projects that were selected by centres. Often the simpler projects were not very well finished and lacked accuracy. Many centres are now directing candidates to make exactly the same product, which makes it difficult to differentiate outcomes, especially when centres award a wide range of marks for outcomes with no discernible differences that can be seen in photographs.

Criterion G – Production plan

Most candidates scored well in this assessment section. They were able to present a sequence of manufacturing tasks in an appropriate order and make reference to realistic time constraints. A few plans were retrospective, while in others, units of time were given in days, dates or lessons with no indication of how long these terms were in real-time. Although not a current requirement through an oversight, many candidates included quality checks in their planning, which was pleasing to see and good practise for the A2 course. Health and safety issues were often featured here too, which counted as part of 'making'

Criterion H – Making

In this section, candidates were well assessed by centres and some very high quality work was seen. However, a good number of centres are setting the same making task every year and seem content with this very formulaic approach that is unadventurous and goes against the ethos of a design and make course where change and improvement ought to be in the forefront of task setting.

A significant number of set tasks lack challenge and complexity and it is difficult to see how such tasks enable candidates to learn new skills, or develop current skills in preparation for A2 work. Simplistic and unchallenging tasks not only limit potential for candidates to score high marks but are surely uninspiring for candidates, particularly those of higher potential.

It is an option in this section that all candidates are allowed to make the same product, but it is true to say that the best work comes from centres where there is some choice of product, or some making decisions are made by candidates.

Many candidates failed to justify the choice of materials used in their making tasks which meant that they were unable to achieve full marks despite demonstrating skills worthy of this level.

Criterion I – Testing

Many candidates scored half marks here but very few achieved higher credit. There was little evidence of any measurable testing that was meaningful going on, mainly because of a lack of measurable manufacturing criteria being established at the beginning of the task.

Third party testing often consisted of superficial, congratulatory comments, sometimes written by the candidate, which did not focus on specification points.

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