

Examiners' Report/ Principal Examiner Feedback

Summer 2010

GCE

GCE Design and Technology (A2): Product Design
(6RM04)
Paper 01 Commercial Design

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Principal Moderator's report on 6RM04 Resistant Materials Technology 2010

In this, the first year of this new 6RM04 RMT course, all centres submitted candidate work that was conceptually and potentially suitable for course requirements. However, it is levels of response that determine whether outcomes are appropriate and these were very mixed. Some excellent work was seen and most centres have coped well with the A2 coursework bearing in mind its familiarity to the previous specification. However, this familiarity has had some negative effects in perceiving the changes designed into the new assessment criteria and has resulted in some candidates not being given the necessary guidance to keep them on task effectively, losing them marks or time wasted in pursuing tasks needlessly.

Almost all candidates identified a client/user group at the beginning of their work, but many failed to mention them again until the final summative evaluation. Candidates are required to employ a commercial approach to their work at this level and act as a commercial designer might when working for a client/user group. This means that consultation between designer and client should take place at key points in the design/make process, which amount to almost all assessment sections. Where this designer/client relationship was well developed, the whole design and make process was enhanced and justified. Unfortunately, many candidates paid only cursory attention to this relationship seeing it as a necessary inconvenience that needed to be addressed to comply with the assessment criteria.

Overall, most centre assessors awarded marks in line with Edexcel's standards in the majority of assessment criteria. Moderators reported that there were fewer disagreed marks than had been the case last year in the legacy specification. Where disagreements did occur, these were commonly in development, making-complexity and testing, and were of a lower level than last year.

Moderators did not report any great administration problems coming from centres, beyond a few addition errors, incorrect transfer of some marks to OPTEMS from CABs and some CABs not signed by teachers and candidates.

Research and analysis

Almost all candidates identified a client or user group in this criterion and were able to achieve well, but many presented much more work than was necessary. It appeared that many centres had failed to note that this section is worth only four marks which are awarded for the analysis and clarification of design needs, accompanied by selective, succinct and focused research. In many instances, candidates submitted copious amounts of generic research that amounted to no more than padding.

Product specification

Most candidates were able to target three of the six marks available but few achieved maximum marks because they failed to develop specification points from research; were unable to justify statements to say why they were relevant; failed to consult with client/user groups in forming specification points and importantly, failed to address issues of sustainability effectively. Sustainability is a new and important issue to be considered, but it appears to have had little impact on candidate thinking so far.

Design and development - Design

This assessment section was addressed competently by most candidates who were on familiar ground. Some outstanding work was seen that demonstrated flair and imagination applied to realistic and workable ideas. At this level, specification points were targeted well and client/user group input was sought and recorded. Annotation included technical information on materials and processes that could be used if designs were taken through to manufacture. Unfortunately, candidates demonstrating high level design skills were in the minority and most settled for more simplistic design ideas accompanied by little technical information, or client/user group input. Many candidates presented ten or more simple design ideas, none of which proceeded beyond the low to medium level of response, when they could have targeted better marks by focusing on three or four ideas in much more detail. Quality of work should not be confused with quantity of work. Ideally, each design idea should be discussed with the client/user group to ensure, through their feedback, its suitability for its intended purpose. It is not necessary to always produce complete solutions in alternative ideas. Depending on the complexity of a design proposal, high credit can be achieved by focusing on sub-systems or parts of design proposals. Client consultation should always be a feature of alternative design presentation.

Design and development - Review

In most cases this criterion was carried out as a separate section, but some candidates were assessed through the comments made on design sheets, which is acceptable. A significant number of candidates failed to realise that the review should take place before the work is developed and carried out the task after design development, which is inappropriate as the point of reviewing initial designs is to gain feedback from client/user groups in order to help in the development of a final design proposal. Some good review work was in evidence, where candidates considered the success of their ideas in matching specification points. Where objective and well informed client/user feedback was recorded, this was informative and helpful in development.

Many candidates treated this section lightly, often failing to address specification points or using tick boxes to evaluate progress.

Sustainability was often mentioned in the review, but hardly ever in any detail. Where candidates presented weak specifications, this section was inevitably weak too, as there was little guidance to evaluate designs formatively.

Design and development - Develop

Once again, the best work seen in this criterion was outstanding, but the vast majority of candidates struggle to understand what design development means. Many candidates simply took one of their initial ideas and used this either in its entirety or with minimal modification as their final design proposal. There are ten marks for development, so it should be obvious that a significant amount of 'new' work must be done to achieve these marks.

Development means 'change', and this should be shown in candidates' work through their ability to use the results of design review and bring together the best or most appropriate features of their design ideas into a coherent and refined final design proposal that meets all of the requirements of the product specification and matches the client/user group needs. 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.

As part of development, candidates should include as much detailed information on all aspects of their developed design as possible, as this is an opportunity to show knowledge and understanding of their design and make activities and to illustrate the gains made through advanced studies of RMT.

Almost all candidates used modelling as part of their design development and there were some excellent examples of this, particularly where 3D CAD was used. Despite the expert use of CAD, not many candidates made statements to say why they were modelling. Modelling is an important aspect of design development and should be used to test features such as proportions, scale, mechanical details, sub-systems etc. There should always be a reason for modelling.

Development should produce a clear and detailed final design proposal that includes technical details of materials, processes, techniques, fixtures and fittings that will be used during product manufacture. There should be enough information present to enable a skilled third party to manufacture the product.

The final developed design proposal should be evaluated objectively against the points of specification and the client/user group needs to justify the design decisions taken and recorded in detail by candidates. Client feedback should be referenced in detail at this point in order to justify and clarify final design details that may be compromises between the student's ideals and the client's preferences.

Design and development - Communicate

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 excellent quality, but dimensioning of CAD drawing tended to be problematic. Where this aspect was generated within the CAD software many dimensions were inappropriate and of no practical value to a third party intending to manufacture the design proposal.

Many centres appear not to have realised that working drawings are not now credited in planning, but are part of design development.

A common failing in this section was the lack of detailed information offered to enable third party construction of the intended product.

Planning

Candidates tackled this section well and most achieved good levels of success. Almost all were able to produce an appropriate work order and this was usually done in the form of a flow chart or table and included the order of assembly of parts or components, tools, equipment and processes to be used during manufacture. Gantt charts were also in evidence. Only a minority of candidates failed to consider quality and safety checks. When recording realistic times for stages of manufacture, a significant number of candidates used units of weeks or lessons, which does not convey real-time i.e. hours/minutes.

Making – Use of tools and equipment

Marks awarded by centre assessors in this section were generally accurate, but there appears to have been confusion among some centres as to how to apply marks in this criterion. Marks are awarded for the skills used by candidates in manipulating tools and equipment. High level skills will demonstrate precision and accuracy. Consideration of safety awareness should be credited here, but any risk assessment illustrated in planning can be used as evidence.

The key to supporting teacher marks is for candidates to present a photographic manufacturing diary to illustrate skills and processes. Most candidates did this, but a significant number did not and a minority used black and white images, which were less than helpful to moderators. A series of photographs taken over a period of time during manufacture is the ideal way to highlight skills and processes used and to provide examples of precision and attention to detail that may not be readily noticeable in an image of the finished product.

Making - Quality

Again, this assessment section was marked fairly by most centre assessors. Marks are gained in this section for the quality of the completed work and its component parts, whether it functions as it is meant to, whether it matches the final design proposal and whether it is appropriate to expected A2 levels of response. Much of the work seen was competent, but much lacked ambition, with candidates staying within their comfort zones instead of taking risks with unfamiliar processes and techniques. Not many candidates justified their choice of materials for manufacture, which could be done easily through simple annotation of photographs or in planning. The importance of high quality photographic evidence is obvious here and most centres are adept at insisting that candidates comply with this requirement.

Making - Complexity/level of demand

This section was generally well marked by centre assessors, but generously in some cases, where candidates had produced well made products but demanded

relatively undemanding and repetitive skills. There was some evidence of butt joints, using knock down fittings to assemble sheet materials and producing line-bent acrylic shapes being awarded high marks, but the vast majority of teachers understand what constitutes complex and challenging tasks. Where it was in evidence, it was pleasing to note that most centres had restricted the use of CAM to the recommended 50% or less, allowing candidates to demonstrate their personal manufacturing skills. Only a few centres allowed an over-reliance on CAM in their candidates work.

Testing and evaluation

Only the best candidates scored well in this section, which is surprising as the requirements are very straightforward and focus on testing the performance and quality of the completed product. For most candidates the success of this section depended upon a strong product specification that could be used to test measurable points, so when a weak specification was presented, inevitably testing was not as effective as it should have been. Many tests tended to be simplistic and subjective and lacked the objectivity of placing the product into real-life situations to test performance.

Third party testing was frequently used, but this often consisted of congratulatory statements which did not consider points of specification. Where it was used properly, it provided an excellent conclusion to the designer/client relationship and provided realistic issues for future modifications.

Life cycle assessment was only tackled by a minority of candidates who usually made a decent job of this aspect of this criterion.

Grade Boundaries

Grade	Max Mark	a*	A	B	C	D	E	N	U
Raw mark boundary	90	79	71	63	55	47	40	33	0
Uniform mark scale boundary	120	108	96	84	72	60	48	36	0

a* is only used in conversion from raw to uniform marks. It is not a published unit grade.

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