

Examiners' Report/ Principal Examiner Feedback

Summer 2010

GCE

GCE Design and Technology(AS): Product Design
(6RM01)
Paper 01 Creative Skills Portfolio

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Principal Moderator's Report on 6RM01 Resistant Materials Technology 2010

It is pleasing to relate that all RMT moderators reported significant improvements in the assessments carried out by centres on candidates' work, which meant they were able to agree marks more easily than was the case last year.

Many centres now have a better understanding of the requirements of the AS course particularly as a result of acting on advice offered in the Principal Moderator's report from 2009. Edexcel's extensive initiative of delivering free support meetings focusing on developing good practice has also been of obvious help to those centres who attended an event.

A particular effort has been made this year to provide centres with focused and useful feedback via E9 documents. E9 documents can be accessed on-line by centres.

Product investigation

Feedback from Inset meetings and anecdotal sources is that centres and their candidates enjoy and feel comfortable with this part of the portfolio of creative skills because it is well structured and the assessment criteria are detailed and easy to follow.

A common failing throughout the product investigation however was that many candidates, despite being knowledgeable about materials and processes, failed to relate their knowledge and understanding directly to the product under investigation.

Criterion A - Performance analysis

Most candidates achieved good levels of success in this criterion, particularly when they used the recommended specification headings listed in the subject specification. The choice of similar product is important in allowing candidates to compare and contrast both products effectively and almost any product is appropriate to investigate initially, but choosing two almost identical TV remote controllers or two very similar MP3 players is inappropriate as specification statements regarding both are likely to be the same when comparing and contrasting under the same headings. It is advisable that candidates try to choose similar products that are focused on different user groups, have different performance and user requirements and are manufactured from different materials. Good examples of this were an injection moulded domestic kettle and an aluminium travel kettle; a cordless power drill and a wheel brace; a high quality fountain pen and a cheap biro.

Overall, this section was tackled well by the vast majority of candidates and scores were usually at least four out of the available six marks.

Criterion B - Materials and components

Almost all candidates were able to identify two materials that were used in the product under investigation and most were able to identify viable alternative materials, although some problems arose where candidates investigated products that were dominated by plastics, leaving little opportunity to identify suitable alternatives. Materials properties were usually identified but many candidates

failed to relate the properties to the needs of the product, giving generic information drawn from textbooks, internet etc. There is no value in stating that mild steel is malleable unless it is pointed out that this property is required in the product for a particular reason. Advantages and disadvantages were considered by most candidates, but were not always related to the needs of the product. It is pointless to record that a particular material is a good electrical insulator when the product is not used around electricity.

Consideration of the environmental impact of using the materials identified was not well done. Responses were often generic, relating to energy and resource use and atmospheric pollution, which are worthy of some credit, but the main considerations should be towards the extraction, processing and disposal of the specific materials used.

Criterion C - Manufacture

Almost all candidates were able to identify two appropriate processes used in the manufacture of the product, but often without justification determined through evaluating the advantages and disadvantages of processes when related to the product. Moderators saw many diagrams of injection moulding machines and read descriptions of the process, but awarded no credit for this information. Marks are gained for the justified selection of the processes identified for use when manufacturing the product.

When suggesting an alternative manufacturing process, many candidates described inappropriate processes in some detail and failed to realise that they could not have been used. A common example of this was where injection moulding had been used and candidates incorrectly suggested blow moulding as an alternative. In this situation, it is acceptable for candidates to suggest a process that would be appropriate if a different material was 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

As was the case last year, this was the least well done section of the product investigation. Most candidates were able to describe quality checks, but often failed to relate these directly to the product under investigation.

Reference to standards was often ignored and where standards were considered, there was hardly ever any explanation of how they influenced the manufacture of the product.

More candidates were able to present quality assurance systems this year, but many were generic and not focused on the product.

In this assessment section, candidates often described what quality control, quality assurance and manufacturing standards are, instead of exemplifying these things in direct relation to 'the product'.

Product design

Criterion E - Design and development

Surprisingly for a design course, this was the most disappointing part of the portfolio of creative skills and is quite concerning. There was some outstanding

work seen, where candidates expressed their flair and creativity, but the majority of work seen in this section lacked the flair and creativity expected.

Much of the work presented did not appear to have been launched with clarity. Vague design briefs were offered and in some cases these were not in evidence at all, which made following what candidate intentions were, very difficult. A significant number of candidates included no design criteria as a starting point which meant that evaluation of the final design proposal could not be carried out appropriately.

In this section, a significant number of candidates simply made a series of poor illustrations of existing designs and called these their alternative design ideas, showing no 'design' input. This staid approach to designing must be discouraged if we are to make any progress with this course of study.

The requirements of 'development' of designs continues to be poorly understood by many candidates. There was of course some excellent work seen that was deserving of high praise, but too much work was below the required standard for AS level. Successful development should show how the final design proposal has been moved on from an original idea through the results of graphical exploration and evaluation. 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. 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.

Modelling was well carried out by most candidates, but not many stated why or for what purpose modelling was being used. This important aspect of design development should be used to test features such as proportions, scale, mechanical details, sub-systems etc. At the end of the development section, most candidates were able to produce a clear and detailed 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 the design criteria.

Within this section, there are opportunities to 'teach' candidates to design. Not all candidates can be expected to be brilliant exponents, but they should be encouraged to take ownership of the design brief and express themselves as creatively as possible. It appears that in a significant number of cases candidates are being left to their own devices and what they produce is accepted within some centres instead of being challenged and advised upon.

Perhaps the most disappointing aspect of all in this section was the leniency with which marks were awarded by some centres. It is very important that centres refer closely to the assessment criteria in order to identify what is worthy of high marks and what is not.

Criterion F - Communicate

Most candidates achieved significant marks in this section and some displayed excellent standards of all-round communication skills. The greatest stumbling block to higher achievement for most candidates was insufficient information presented in the final design proposal to allow 3rd party manufacture of the intended product.

Where CAD drawings were presented and used 'auto-dimensioning' generated from 3D CAD modelling, dimensions were frequently inappropriate and irrelevant. Such drawings should be modified to ensure their usefulness.

The overall quality of sketching from candidates was poor, which is disappointing as such skills can be taught and practised. There were some good examples of a minority of centres who had obviously taught presentation skills as the whole cohort of candidates were competent in this respect.

Product manufacture

Criterion G - Production plan

Moderators reported an improvement in this criterion with most candidates achieving at least four from the six available marks. Candidates should achieve good marks in planning as it is no more than a clerical exercise that takes a little logical thought.

Some candidates however failed to include 'real time' in hours and minutes highlighting instead, weeks, lessons, days or dates, which convey no detailed information to a moderator.

A minority of candidates presented retrospective plans, which in fact were not plans but diaries of events. The use of the wrong tense i.e. 'I did' instead of 'I will' penalises candidates as planning is a forward looking exercise and can only be rewarded as such.

Many candidates included health and safety, a feature not necessary in planning, but a requirement of 'making' which can be evidenced here.

Methods of presenting planning information included flow charts, tables and Gantt charts, which were all acceptable as long as they contained the necessary information.

Criterion H - Making

As was the case last year, most candidates achieved their best results in this section. The majority of centres set only one manufacturing task, which is fine, but a minority of these tasks used only a single material, which does not match the criteria for the higher levels of response.

The assessment criterion states that a 'range' of appropriate materials must be selected and that candidates should work with a 'variety' of materials, processes and techniques. In order to fulfil these requirements, the use of at least two materials and processes must be evidenced.

The vast majority of centres were in line with the requirements of this section and set manufacturing tasks that allowed candidates to experience a range of materials, processes and techniques, planned to develop skills that candidates could call upon when designing and making their A2 project, and some high quality outcomes were seen.

Where very prescriptive single tasks were set and all candidates in a cohort were given the same detailed working drawing, cutting list and materials, the outcomes were often difficult to differentiate between unless high quality photographs showing individual skill levels were provided. In much of the work presented, there were opportunities for candidates to make manufacturing decisions, such as choice of materials from those available in a centre, choice of joining techniques,

use of certain processes, finishes etc, which would have given candidates more ownership of their work and helped in differentiation.

A problem with many of the manufacturing tasks set by centres was that they fell short of the AS standard. A significant number of tasks were simplistic and undemanding and did not have the scope to allow candidates to demonstrate high level skills.

In general, marks awarded by centres in this assessment section were agreed during moderation, and where there were discrepancies between centre and moderator marks, this was often because candidates had not justified their selection of materials, a requirement made clear in the assessment criteria.

Criterion I - Testing

Commentary on testing carried out on completed manufacturing tasks exactly reflects statements made last year.

For many candidates, this criterion caused some problems of understanding. Tests were often superficial and subjective and were not based on the manufacturing criteria set at the beginning of a task. This section was often treated subjectively and superficially and only the most capable candidates were able to form objective conclusions from testing. Many candidates used third party commentary as evidence of testing, but this was often superficial, consisting of brief congratulatory statements unrelated to points of manufacturing criteria.

Grade Boundaries

GCE2008 AS Unit grade boundary model

| Grade | Max Mark | A | B | C | D | E | N | U |
|-----------------------------|----------|----|----|----|----|----|----|---|
| Raw mark boundary | 90 | 73 | 64 | 56 | 48 | 40 | 32 | 0 |
| Uniform mark scale boundary | 120 | 96 | 84 | 72 | 60 | 48 | 36 | 0 |

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