

Moderators' Report/  
Principal Moderator Feedback

Summer 2012

GCSE

Engineering  
5EG01 Paper 01

Engineering Design and Graphical  
Communication

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## **Unit 5EG01**

# **Engineering Design and Graphical Communication**

Summer 2012 was the second assessment of the 5EG01 Design and Graphical Communication unit of the 2EG02 specification for the Edexcel GCSE Engineering qualification. This Principal Moderator's Feedback report provides comment on centre and candidate performance in the 2012 assessment, as demonstrated during the moderation exercise following centre submission of the candidate portfolios. It will also report on progress made at centres in response to the issues raised in the 2011 report following the first assessment.

For the 5EG01 unit specification, candidates are required to analyse a centre-given design brief to produce a design specification and design solutions, presenting a final design solution using a range of engineering drawings. The evidence for the unit is required to be produced within 33 hours under Controlled Assessment conditions. Advice and guidance about Controlled Assessment is available on the website in the Teacher Support Book for the qualification. This Controlled Assessment includes the Controlled Assessment Task for criterion (e) of the unit, providing standardised assessment in the interpretation of engineering drawings and circuit diagrams. Details of this CA Task for (e) are also found on the website.

The eight assessment criteria take candidates through the standard engineering design process from customer brief to the presentation of final design to client or proxy, as a presentation document, with the client/proxy able to suggest modifications for further design work and marks. A range of drawing techniques including final engineering drawings suitable for production purposes will be used across the design process and included in the candidate portfolio.

Design work for the unit is produced under controlled conditions and includes the Edexcel-set CA Task for criterion (e), reviewed every two years. The 2012 assessment was undertaken to the same CA Task for criterion (e) as in 2011 but centres are reminded to look on the Edexcel website for the qualification for any changes in this CA Task for 2013 following the two-year review. All other work for the portfolio is in response to the centre-devised brief.

The quality of written communication (QWC) is a progressively rewarded component in five of the eight criteria (not the CA Task, nor the explicit drawings criteria). The Teacher Support Book on the website, Section 3, highlights the evidence expected at the criteria generally, to meet the criteria requirements at the Mark Ranges, including for QWC. The eight-mark criterion is at (g) and rewards engineering drawing skills to sector standards.

### **Design Briefs**

Many centres have continued with a design brief as established for use previously. Issues at moderation do not usually arise due to choice of design topic itself. A number of innovative design projects have emerged at this second assessment/moderation of the current specification and these will be evaluated at centres for effectiveness. Meanwhile, centres have shown some incremental embracing of the lessons of the first moderation in 2011.

Many of these design briefs can be made to work well, provided candidates are focussed on the engineering design aspects. Alarms, lamps, torches, all have good electronic/mechanical features and engineering design possibilities, including design for assembly. iPod/MP3 docking stations do tend to slip quickly into aesthetics-only design of 'form' with attendant focus on rendered CAD. Novelty sweet dispensers do not work well, with the dispensing mechanisms proving to be too challenging. Can crushers with a designed and located electronic 'Can Crushed OK' signal output will cover the required range very well.

It is, however, pleasing to see that centres are not doing 'design and make' projects covering both units 5EG01 and 5EG02, with all the attendant problems of lack of coverage of all criteria in both units.

Familiarisation with the new specification is developing, but the detailed interpretation of criteria is still a clear teacher or assessor developmental need. The 5EG01 criteria do mirror the standard engineering design process and there is a continuing need for centres to foster the design aspects and avoid the unit becoming a CAD unit, without the engineering design element (often without electronics, mechanisms and assembly fittings). Where appropriate to the design, candidates need to present hand-drawn or CAD of electronics circuits, and not mere screen shots of trial circuits. Having established and drawn a final circuit, any pcb track layouts may then be appended.

Some centres still need awareness of the specific CA Task as a separate assessment task for (e); those that were aware used this Task to good effect to gain marks. Some centre still appear to have forgotten this Task or did not know of this Task, or self-interpreted the requirements, where this occurred the moderator has included comments in centre reports giving reference to the Edexcel website for the details of this CA Task for (e).

It remains the case, that some continuing issues are reported by moderators: the 'product design' of 'form' with little work on the design solutions to the electronic or mechanism engineering problems posed by the brief has been referred to. The use of scientific principles in the development of engineering solutions is still not a strong feature of portfolios presented so that Higher Mark Range marks are not accessed (at moderation). Some centres appear to bolt-on some 'electronics' to a project to capture further marks but this leads to a lack of coherence between the mechanical or product design of the outer form of the product, and the electronics design of the inner lamp, alarm or indicator. How the latter are fixed into the former is usually an unattended issue, as are cell/battery compartment designs.

It is, however, pleasing to see that centres are not doing 'design and make' projects, with all their attendant problems of lack of coverage of criteria in both units.

The use of centre-prepared pro-formas does serve to maximise candidate focus on the detail of criteria but does reduce the differentiation between the evidence presented and possibly inhibits the strongest candidates from full demonstration of their abilities.

There was the occasional instance of a problem caused by a failure to standardise across assessors – a single assessor is the norm even with the larger cohorts. The Controlled Assessment Record Sheet served as the Authentication

Document for candidates. The Tracking Sheet allows for assessor annotation and page number pointers.

## **Standard of Assessment**

Centre assessment remains generally lenient, even when centre marking is considered overall to be in line with the national standard for this unit. There were some cases of extreme leniency amounting to over marking of some 10 marks out of the 50 available. General inaccuracy in scoring was to do with poor interpretation of one or more of the criteria.

There appears to be a lack of focus on engineering design, and too much on aesthetics of the form (the casing) of the product.

Criterion (a) and Criterion (b) - there is often good work at the analysis of the brief and client needs stage, but a poor grasp of the conversion of this to an engineering design specification.

Criterion (c) - some of the design sketching presented at criterion (c), and its attendant developmental work and use of underpinning principles, was impressive and accurately marked. This was a positive feature of the 2012 moderation. At the other extreme there was some very superficial work presented here, of poor quality, hesitant, poorly presented with poor sketching.

Criterion (d) - there was generally low achieving work at the selection between the (sometimes limited) variations in design ideas. Here, most candidates were at Mark Range 1 for selection of design by arbitrary scoring on a grid. Some limited modelling was seen but very little detailed argumentation, hardly any beyond 'because it met the high quality standards' (without any such evidence). Questionnaires at this stage need to be addressed to the client, not to classmates about their preferences for colours or shapes.

Criterion (e) - has been referred to elsewhere in this Report

Criterion (f) - (Selecting engineering drawing techniques) - there is still poor treatment of the 2<sup>nd</sup> part of the criterion across the Mark Ranges. Rather than presenting a generic teacher-generated handout, candidates should draw up a table listing their own drawings and indicating their intended audience and purpose.

Criterion (g) - there is still a tendency to present 'rendered CAD' perspective views to no particular purpose, rather than manual or CAD engineering drawings and circuit diagrams. The lack of earlier design of engineered component parts limits the marks for the second part of the criterion (standard symbols) best served by electronics aspects of the design, though too often this can look like a separated activity with limited relevance. Stronger candidates tended to achieve marks in Mark Range 2, rather than Mark Range 3, where manual and CAD drawings are required and where Expected Evidence indicates the need for assembly drawings and exploded views.

Criterion (h) - candidates can score well when they take the criterion on face value, including when a separate re-statement is presented to client or proxy, and when modifications are picked up and developed. Modifications do tend to be neglected, being at the end of the Controlled Assessment time.

Centres often were lenient in the marks awarded for quality of written communication (QWC).

Lack of consistency within centres was not a general issue this year. Centre assessors were usually consistent in their interpretations and misinterpretations; instances of inconsistency were investigated and comments made to centres.

The general quality of presentation of portfolios does not seem to be improving, especially where hand written work is concerned. The Controlled Assessment task for (e) was not presented well or with much formality. Where this means that a moderator cannot read or find answers, then centre marking becomes difficult to check and verify.

Centres are once again urged to apply these comments to their work for 5EG01 in 2013.

Centre candidates are congratulated on their efforts in the application of the engineering design process and in the production of good sketches and CAD drawings. Appreciation of the formalities of engineering drawing will develop during progression, for which this experience will have been a useful preparation.

### **Administration**

There were again some instances of numerical typo and recording errors made at centres in the handling of the numerical marks (details will have been noted in individual centre reports) but centres and candidates did generally gather their portfolios and deliver them for moderation in good time, good order and with necessary documentation completed accurately, including highest and lowest. Centres did also respond quickly following E6 reminders sent where and when necessary. There was good use of the Candidate Record Sheet and its Authentication Declaration and the Controlled Assessment Tracking Sheet was put to good use for page numbering and annotation, which is always helpful to the moderation process.

Centres continue to use a range of formats for candidate portfolios. It should be noted that single-sided (and indeed A4 size) work with the single top-corner 'treasury tag' method of fixing remains the ideal. Centres can then incorporate their Record and Tracking Sheets and CA Task for (e) into that format.

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