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Moderators' Report/ Principal Moderator Feedback

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GCSE

Engineering
5EG01 Paper 01

Engineering Design and Graphical Communication

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Unit 5EG01
Engineering Design and Graphical Communication

Summer 2011 was the first assessment of 5EG01 Engineering Design and Graphical Communication, unit one of the new 2EG02 specification for the Edexcel GCSE Engineering qualification. There is a requirement for conditions of 'controlled assessment' for the production of evidence of this centre-assessed unit. There are general similarities between the 'old' and the 'new' specification and there are particular differences. One purpose of this report is to highlight to centres these particular differences, where these were missed. Whilst most centres proceeded well with the new specification, with candidate design activities based on the general similarities, applying previous experience, it has to be reported that some centres did not seem aware that anything much had changed. All centres will now benefit from a report that points out the particular differences, now that the first assessment has been undertaken.

There is no doubt that some candidates were disadvantaged this first time by the lack of centre attention to the details of the new specification and this report is intended to help support and guide centres preparing for assessment in 2012. Centres are pointed to the 2EG02 specification document on the Edexcel website, and to the stipulation that the work for the unit is done under controlled conditions within 26 – 33 hours. This stipulation does then require that centres develop an efficiency of approach to the 33 hours maximum, an efficiency that in turn requires a focus on the new detail of the assessment criteria.

Those centres that have well-developed experience with previous design topics were able to continue with these topics into the new specification but now need to note those significant differences. Some centres did not note these differences on this occasion.

Unit 5EG01 begins as previously with a given client design brief for candidates to analyse and work up into a product design specification (a statement of the engineering design problems posed by the client brief). The work done for this design specification is still poorly done by some candidates. Candidates then, as previously, are required to generate some possible design solutions via the application of scientific principles, for testing prior to selection of the final solution. The evidence expected for these four criteria is detailed in Section 3 of the Teacher Support Book, also on the website. These criteria also make strong reference to the Quality of Written Communication (QWC) shown by the candidate. Descriptions and explanations that do not show sound, or better, spelling, punctuation and grammar, or work that is merely listing, are unlikely to achieve the higher mark ranges. At this first assessment, centre assessors did not comment on the influence of QWC on the scores given, and some centre scoring was optimistic given the standard of QWC seen. Candidates who did reach the higher mark ranges did need to satisfy QWC requirements as well as

the technical design requirements. These former requirements apply also to the descriptive presentation and discussion of modifications (as a result of client or proxy feedback) that are the subject of criterion (h).

The advent of the new specification has not prevented some centres (and their candidates) from continuing to focus on ‘design of form’ (the aesthetic shape of an outer casing) rather than on ‘design of engineering function’. The engineering problems associated with eg cycle/shed alarms or table-top lamps concern how the electrics/electronics/mechanical fixings/power sources/devices work and are connected-in to the whole, and these need to be the subject of design consideration, not just the outer shape. By taking the latter approach, candidates failed to give themselves the wider scope of detail for the engineering drawings required for higher marks at criterion (g) later. It was disappointing again to see candidates getting carried away with rendered CAD drawings of ‘form’ and ‘shape’, to little assessment purpose.

It is the testing and selection between alternative engineering details that should be the focus at criterion (d). Some centres still need to avoid the use of ‘classmate questionnaires’ as a substitute for the design process or as a substitute for client opinion at this ‘testing and selecting’ stage. Testing should focus on engineering differences (eg different circuit solutions, different mounting/fixing alternatives, different light-bulb solutions, different beam designs via CAD software). Decision-tables were again a welcome feature but these should show more engineering and less of the arbitrary statements without any evidence. Centres are also reminded that criterion (d) requires a full description of why the chosen solution meets the design criteria. This can be the same ‘presentation document’ (with credit for QWC) used for criterion (h), so that work at (h) can then focus on modifications as a result of client feedback.

The new criterion (e), assessed by a specific Controlled Assessment Task under controlled conditions, was a surprise to some centres (a few others used their own drawings and diagrams). Marks cannot be awarded for a criterion that is not addressed. All centres are referred to the website document for Unit 5EG01 Engineering Design and Graphical Communication, ‘Controlled Assessment’, where the questions set for criterion (e) are listed (and subject to current review). The ‘restricted access’ document ‘Teacher Guidance for Controlled Assessment’ contains the drawings and diagrams required to be issued to candidates at the controlled assessment session devoted to criterion (e). The great majority of centres dealt well with (e) and candidates were able to gain marks relatively well here. Centre marking was accurate for this activity and the work was included in portfolios as required.

The new specification has an additional criterion (g) worth eight marks that rewards candidates specifically for their engineering drawing skills (at orthographic projection and/or schematic circuit diagrams, most commonly

electrical/electronic at this level). The detailed engineering design referred to above should have provided the range of parts, components and standard symbols required for these engineering drawings. Such drawings are targeted at production or electronics assembly engineers who will make such designed products from them.

The Expected Evidence listing for this criterion indicates that work for criterion (g) forms part of the range of drawings presented as evidence for criterion (f). It was disappointing that centres continued to misunderstood this criterion (f) (a similar criterion was present in the previous specification) so that candidates again did not to score well here. Across a candidate portfolio there is a range of drawing techniques used, not necessarily confined to the section for (f). The design stage will show freehand sketches and freehand perspective drawings, the presentation document at (d) and/or (h) may well show rendered CAD 3D drawings (of form) and a flow diagram capturing the iterative design process. Centre assessors can award marks at (f) for this range of drawings across the portfolio, including for the presence of engineering drawings at (g). The second part of (f) is not designed (and was not previously) so that marks are awarded for the inclusion of generic ‘classwork’ notes on the purpose and audience of drawings generally. This ‘audience for drawings’ requirement is part of controlled assessment and following this first assessment it is clear that some centres need to review their approach. The highest marks for criterion (f) were obtained where candidates tabulated a record of all the drawing techniques they had selected to use and then showed ‘considered account’ of the intended purpose and audience in their case, by completing their table with entries to this effect. Even here, candidates did not include the role of their freehand sketches in the design development and review process with an audience of ‘self’ or ‘critical design friends’, or client/proxy.

At criterion (g), many candidates were constrained by their lack of detailed design-work earlier and, as with the previous specification, presented engineering drawings that were lacking in components, standard symbols and sector-specific standards and conventions. Statements of the purpose of components and features are no longer required at this criterion, such things now being assessed at (e). Candidates did not access the highest marks at (g) unless both manual and CAD drawings were presented to appropriate standards and unless assembly/exploded views were seen (this again requiring design work that went beyond ‘form’).

Thus centre lack of familiarity with/adaptation to the details of the new specification led to some leniency of mark allocation at the centre-marking stage. Centres need now to rationalise their Unit 1 activities to become efficient at the use of a maximum of 33 hours of controlled assessment.

There were a series 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 portfolios of the highest and lowest marked candidates. 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 also put to good use for page numbering and annotation, which is always helpful at the moderation stage.

Centres use a range of formats for candidate portfolios. It should be noted that certain portfolio binding methods are not recommended eg sub-folders which are inconvenient. Single-sided work is clearly preferred and in many respects the single top-corner ‘treasury tag’ method of fixing remains the ideal.

Centres are thanked for their co-operation in this first assessment of the new specification and candidates praised for their best efforts and success. Centres and candidates for 2012 are strongly urged to look closely at the lessons of the first assessment, as reported here.

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