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Moderators' Report/ Principal Moderator Feedback

Summer 2012

GCSE Engineering

5EG02 Paper 01

Engineered Products

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Unit 5EG02
Engineered Products

Summer 2012 was the second assessment of the 5EG02 Unit 2 Engineered Products 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, following the moderation of the assessed candidate portfolios submitted for the unit. It will also act as a report on progress made at centres in response to the issues raised in the 2011 report following the first assessment.

For the 5EG02 unit specification, candidates are required to interpret a given product specification, producing production plans to enable the selection and use of suitable tools, components and processes to produce an engineered product safely and accurately with skill, and test its performance.

The eight assessment criteria take candidates through the standard engineering production process, from interpreting received specification and drawings (including bought-in components), to the planning of operations, equipment, materials, preparing and using safely these materials, components and processes to make a product and checking it against tolerances, with assembly into a completed product and testing the performance.

Centres are able to choose their own product to be made and tested and all of the work for the unit is produced under controlled conditions (33 hours max). There is no specific CA Task as there is for unit 5EG01.

The quality of written communication (QWC) demonstrated by candidates is a progressively assessed component in three of the criteria: (b), (c), (h).The eight-mark criterion (f) is for the safe and skillful use of processes and can be seen as the reward for the demonstration of accurate practical skills.

The product to be engineered is centre-chosen/devised within the parameters set by Edexcel about the use of the processes listed in the specification: material removal, shaping/manipulation, joining/assembly, heat/chemical treatment, surface finishing. There is still some laxity at centres in the application of all these parameters in the making of the product.

Where centres use some newer technologies of CAD/CAM for the purposes of this unit eg the use of CAD files for laser cutting or other software for CNC programming, these do not fit easily into 5EG02 criteria but can be assessed and moderated as part of criterion (f). The CAD aspects can be a distraction in the time available for this unit, in which CAD is not rewarded.

It is worth repeating the general requirements of candidates arising out of the specification, and assessment criteria (see also the Teacher Support Book on the Edexcel website for the qualification).

The requirement is for witness testimony to 'support/guidance' given, or 'independence', at six of the eight criteria.

Criterion (b) and criterion (c) - production plans at (b) and (c) now emphasise range of planning, not depth of description/justification of planning.

Criterion (d) and criterion (e) - 'selection' is no longer required in the present specification at criteria (d) and (e), the focus now being on preparation and safe use of materials and components with skill. Thus research work and presentations on materials and components only serves to use up valuable controlled assessment time.

Criterion (f) - 'selection' of processes, tools and equipment does remain at (f) and ties in with production plans where candidates indicate their choice of processes and sequence to make the product and the 'use' of these processes safely with skill is rewarded

Criterion (g) - 'safe use' of processes with skill to complete the assembled and finished product is further rewarded at this criterion. Better marks at (g) require an assembled, finished, completed product and evidence of accuracy through Inspection Sheets

Criterion (h) - requires test data on the performance of the completed product, tested against the specified performance requirement of the product.

The use of materials, parts and components and of processes, tools and equipment, with skill and accuracy is rewarded at Higher Mark Range at criteria (d), (e) (f) and again at (g), and there is an expectation of witness testimony to support candidate evidence of high quality completion.

Thus some coherence of marks should be expected across criteria (a) (d) (e) (f) (g) and (h) and if these are all accomplished it is likely to have been because of good planning at (b) and (c). These would be the characteristics of a good 'practical engineer who can communicate' using appropriate standards of QWC.

Standard of Assessment

There is no evidence in 2012 of problems 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.

There is a continuing leniency in marking for 5EG02, due to the issues raised above and detailed below and continuing from the issues raised in the 2011 report:

- Witness testimony was stronger than actual direct candidate evidence provided. Witness testimony needs to be supplementary to candidate evidence, not a substitute for it.

- Production planning did not include the range of proposed activities - often not the electronics, not assembly operations, not planning for testing at (h). Planning for quality checks later at criterion (g) is usually included but 'production constraints' at (c) are poorly appreciated.

- Lack of candidate written work, or poor written work, at (b) (c) and (h) meant that marks for QWC at moderation were not as high as they could have been.

- Candidates did not provide direct focussed evidence at (d) (e) separately, preferring to focus on (f) only, so that Mark Range 3 marks were awarded leniently, without particular evidence at (d) and (e). Electronics work for (e) (f) presented as an add-on, with no appreciation shown of the integrated requirements of the product, made it hard to justify Mark Range 3 at (f). Moderators have commented on the value of photo-narrative but also on the variability of such evidence, relying as it might well do, on the photo-skills and equipment of individual, or tutor/assessor.

- Skill level judgements require measurements for 'in/out of tolerance' to be shown for (g) (which itself needs specified tolerances to be included in the first instance) plus commentary on the quality of any electronics made.

- Confusion between (g) and (h), not helped if the product specification does not have appropriate performance levels specified so that Mark Range 3 marks are not reached for testing performance at (h).

The removal of the requirement to 'select' at (d) and (e) may still be ignored by some centres, but this has little effect on moderated marks – the extra work only serves to use up Controlled Assessment time. The issue of centre-produced pro-formas can be formulaic; although helpful in promoting candidate focus on requirements, stronger candidates can be constrained. Centres are still largely allocating marks incorrectly for 'QWC' at the three criteria concerned.

Candidates are congratulated on their work towards the completion and testing of their engineered products. There was the typical range of success, rewarded appropriately after moderation, and candidate photo-narratives showed application, attention to safety and pride. Portfolios gave a feel for the enjoyment of a worthwhile engineering experience and it can be hoped that this will be built on in progression opportunities, all of which will also require a blend of practical and communication skills measured against criteria.

A similar range of 5EG02 projects was attempted for 2012 completion, including lamps, alarms, torches, alarmed toolboxes, model racing cars , wind turbines, garden sprinklers.

These worked well as projects where there are sufficient requirements to satisfy the range of processes specified, where the specification includes 'bought-in' components for assembly and where the electronics element of the work is integrated into the overall activity. Where the crucial role of witness testimony to the independence, or otherwise, of the candidate (and as supplementary to the candidate evidence) was effectively presented, aided the moderation process.

Some centres use the completion of kit-cars or kit/models but these are not considered ideal for the assessment of this unit. The requirements of such kits lack the use of the range of processes and are not particularly challenging to the able engineer. The work is mostly assembly work, and even then the planning of the assembly and test aspects is often neglected.

Interpretation of the new criteria still needs some attention and centres need reminding about the inclusion of marks for quality of written communication presented, as a legitimate skill for engineers to demonstrate, in this unit.

Administration

As in the case of Unit 5EG01, at Unit 5EG02 there were some 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, always helpful at the moderation stage. There was a variable quality to the formats used for the witness testimonies provided for this unit.

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 into that format.

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