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Moderators' Report/ Principal Moderator Feedback

June 2011

GCE Engineering

Unit 6933_01

Principles of Design, Planning and Prototyping

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Unit 6933
Principles of Design, Planning and Prototyping

General comments

Moderators report that some excellent work in engineering was seen and centres continue to target marks effectively through a clearer understanding year on year of the requirements of this unit.

There was a continued improvement in the approach to 'Engineering' coursework where scientific and mathematic concepts were considered, and there were almost no 'Design & Technology' style projects, where the focus is on form and function rather than justified engineering concepts.

A wide range of coursework projects were undertaken by candidates and Edexcel approved titles such as PCB holder and mini-drill stand were popular choices. Other tasks included temperature/light sensitive projects, desks lamps, aids for the disabled, jigs and fixtures to help with DIY projects, bicycle maintenance stands, go carts and many more.

All work seen was potentially appropriate to the demands of this unit and provided opportunities to access the full range of marks. However, a significant number of candidates failed to achieve the quality and skill levels necessary to gain the higher marks. Where electronic project work was submitted for moderation, there was usually little evidence of the quality of making linked to the electronic circuitry. Design and development of electronic circuitry and evidence of soldering neatly, dealing with flying leads, anchoring circuit boards inside cases etc are all creditworthy activities.

Assessment Criteria (a)

In this assessment criterion, the vast majority of candidates were able to score significant marks. CAD packages used to produce engineering drawings were more prevalent than images drawn by hand and where this was done properly, some excellent work was seen. However, a significant number of candidates generated orthographic views from 3D CAD sketches without any attempt to modify the drawings. This meant that title blocks were incomplete, dimensions were unrealistic e.g. 322.56, units of measurement were not included and dimensioning styles did not conform to British Standards. Some of the reasons this criterion was included in this unit of study were to enable candidates to learn how to lay-out formal drawings, how to detail them and importantly, how to read and use engineering drawings when designing and making engineering products. Using a computer in order to generate a 2D drawing from a 3D sketch fails to meet any of these intentions and should not be pursued.

In general, the quality of engineering drawings showed an improvement on last year and more candidates included enough information to enable product manufacture. However, some drawings presented were limited in quality and some candidates did not understand what the requirements of a 'range' of engineering drawings involved, failing to produce detailed pictorial views,

assembly drawings, exploded views etc. Some drawings lacked important dimensions, while others were not drawn to scale. Many candidates produced several high quality engineering drawings, but failed to demonstrate their understanding of conventions for such things as hidden detail, sectioning, dimensioning circles, radii etc.

Assessment Criteria (b)

As was the case last year, most candidates were able to achieve good levels of success in this criterion. A sequence of manufacturing tasks presented in the correct order and related timing for those tasks was well considered by most candidates, who also added quality control checks and safety issues, which is very encouraging to note. Where Gantt charts are used in this section, it is expected that only manufacturing details are included; some candidates included the whole of the design and make project, neglecting the necessary detail of manufacturing to achieve higher marks.

The majority of candidates were able to write appropriate product specifications that included some key points that were technical, measurable and justified. However, despite containing many statements, a significant number of product specifications were superficial and generic, lacking information that could have been used to evaluate the final outcome.
Some candidates gathered much research, but this was often unfocused, did not relate directly to the problem in hand and was rarely referred to when developing the product specification.

Assessment Criteria (c)

Some excellent work was seen from a minority of candidates who were able to score very high marks and significantly more achieved in excess of half marks. Many more candidates than previously were able to adopt an 'Engineering' approach to their work, where the influence of scientific/mathematic principals can be seen when selecting possible materials and processes linked to design ideas.

Most candidates presented a range of alternative design ideas relating to their chosen project using some appropriate design strategies, but it was obvious in too many cases that candidates had already decided that the first idea produced was the one they were determined to manufacture.

Often, ideas were of a low level, lacking a true understanding of the identified problem and not relating with any significance to the product specification. Some candidates did not appear to realise that the written product specification is there as a guide and control over subsequent designing and development and must be referenced to ensure the final design proposal meets design needs.

Where electronic projects were undertaken, it was common to find that candidates had little understanding of the electronic content of their work, as this was not referred to in detail or described well. Instead, the focus of designing was on the case to hold circuitry.

Assessment Criteria (d)

Once again this year evidence of high quality skills was seen in many of the practical outcomes presented. It was common to see completed work that was well finished and fully functional. Where skills were not of the highest order, this was usually recognised by the centre assessor and rewarded appropriately.

There is still an issue regarding the quality of photographic evidence presented by some centres. The practical outcome is worth one third of the marks available, so it is essential that clear and detailed photographic evidence of manufacturing and processes used is supplied, otherwise no marks can be awarded in this assessment section.

Despite submitting photographic images of practical work, a significant number lacked the detail necessary to illustrate the complexity of task and the higher-level skills necessary to gain higher marks.

A series of photographs taken over a period of time during manufacture is the ideal way of highlighting processes used and providing examples of precision and attention to detail that may not be readily noticeable in an image of the finished product.

Photographic evidence can also be employed to support a candidate's awareness of health and safety issues when working.

Assessment Criteria (e)

Most candidates provided appropriate evidence of oral presentations, which included hard copies of Powerpoint slides, CD Roms and teacher witness statements, which were generally informative and provided useful annotation regarding individual candidate performances. Where centre assessors award marks in the higher regions for criterion E, it is essential that evidence beyond simple witness statements is supplied in support of the credit given.

Administration

Most centres submitted samples of work on time, but some did not include authentication sheets. Most centres submitted marks appropriately, but some used copies of the assessment criteria photocopied from the subject specification and wrote marks on these. Where this occurred, there was no accompanying annotation to point out where evidence could be found, which hindered moderation.

Most centres presented well organised folios of work and carried out administrative tasks well, but moderators still reported ongoing problems in some centres such as poor packaging of samples, several pages in one plastic sleeve and more than the selected sample of candidate folders being sent.
A few centre assessors made addition errors when totalling candidate marks and errors in transferring marks from mark sheets to OPTEMS.

Overall however, teacher assessment continues to improve in terms of accuracy and consistency and centres are congratulated on the care taken in this regard.

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