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Principal Moderator Feedback

Summer 2010

GCE

GCE Engineering: 6933 01
Principles of Design, Planning and Prototyping

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Principal Moderator Report GCE Engineering

Unit 3: 6933 Principles of Design, Planning and Prototyping

It is pleasing to report once again that some excellent work in engineering was seen and hardly any was inappropriate to the requirements of Unit 3
Most centres are now familiar with assessment criteria and how to target marks effectively and this is due in some part to heeding advice given in E9 moderator feedback reports and to reading and acting upon advice offered in reports such as this.

There was an improvement too in the majority of students' approach to 'Engineering' coursework where scientific and mathematic concepts were considered, and there were very few 'Design & Technology' style projects, where the focus was on form and function rather than justified engineering concepts.

A wide range of coursework projects was undertaken by students and Edexcel approved titles such as PCB holder and paint can shaker were popular choices, but many centres are encouraging students to broaden their choice of task to include titles such as fish feeders, temperature sensitive desk fans, desks lamps, aids for the disabled, jigs and fixtures to help with DIY projects 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 students failed to achieve the quality and skill levels necessary to gain high marks. Where electronic project work was submitted for moderation, there was usually little evidence of the quality of making linked to the electronic circuitry. Credit can be gained for the 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.

Most centres submitted samples of work on time, but a significant number failed to 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, which hindered moderation. Some centres used their own assessment grids to record marks, which were often difficult and awkward to follow.

Most centres presented well organised folios of work and carried out administrative tasks well, but moderators still complained of ongoing problems in some centres such as poor packaging of samples, loose, unidentified pages, several pages in one plastic sleeve, folders containing manufacturers brochures, worthless in terms of credit, which were all avoidable issues that added to the burden of moderation.

A few centre assessors made addition errors when totalling student 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.

Assessment criterion (a)
The response to this assessment criterion continues to improve. More students this year used CAD packages to produce engineering drawings and showed high levels of expertise in this area. However, a significant number of students failed to complete title blocks, include details of materials and parts, or use appropriate dimensioning that conformed to British Standards.

The vast majority of students were able to produce images of some description that could be called formal engineering drawings, and these usually included some industry standard symbols and drawing conventions. A significant number of drawings however were limited in quality and understanding and students failed to comprehend 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 students produced several high quality engineering drawings, but failed to include enough information to enable the successful manufacture of the designed prototype.

Assessment criterion (b)

In this assessment criterion most students were able to achieve good levels of success. The requirements of a sequence of manufacturing tasks and related timing for those tasks is now widely supplemented by the vast majority of students who also include quality control and safety issues, which is excellent practice. Where Gantt charts are used in this section, it is expected that only manufacturing details are included; some students included the whole of the design and make project, neglecting the necessary detail of manufacturing to achieve higher marks.

There was an improvement in the quality of specifications presented. Most students were able to identify key points, but there was often no justification to accompany the statement. A statement such as "the material must have a weather resistant finish" is not justified until it is justified e.g. "because it will be used outside in all conditions."

A significant number of product specifications contained many points, but these were often superficial and generic and lacked technical information that could have been used to evaluate the final outcome. It is important to include measurable point wherever possible as these will be used to test the final product against after completion. Statements such as "the product must be made by me" or "I must finish my work by the end of April" are not valid statements as they do not focus on the performance or quality of the intended product.

As in previous years, some students spent a great deal of time and effort collecting copious amounts research, but much of this was unfocused and did not relate directly to the problem in hand and was hardly referred to when developing the product specification.

Assessment criterion (c)

Although some students scored very high marks in this section and many more achieved quite well, this is the criterion that most students perform less well in.
Although more students appreciated the 'Engineering' approach to their work, where materials choices and selection of processes need to be scientifically/mathematically justified, many missed opportunities to explore these justifications.
There was little evidence of students using their research to help with ideas and it was rare to see reference made to specification points at this stage.
Where electronic circuitry was included in project work, it was usually of low level and was often based on a 'found' circuit that students had not developed at all.
Most students presented a range of alternative design ideas relating to their chosen project using some appropriate design strategies, but design ideas were often not well analysed in terms of possible materials and processes that could be used in their manufacture and there was little evidence of research information being used in the designs presented. Many ideas were of a low level, lacking a true understanding of

the problems and moderators reported that in many cases it appeared that students had already decided what the practical outcome would be and their design efforts were no more than hoops to jump through to comply with the requirements of the assessment criteria.

Assessment criterion (d)

In this assessment section, evidence was seen of high quality skills presented by a significant number of students who had obviously enjoyed their coursework experiences and had succeeded in producing successful, working prototypes. Most students succeeded in producing a practical outcome to their chosen problem that reflected their final design proposal and it was very pleasing to see that almost all practical work was complete. Where skills were modest, this was usually recognised by the teacher 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 student's awareness of health and safety issues when working.

Not many students provided details of materials and their selection based on mathematical or scientific reasoning. Students would benefit in future from consulting materials data/performance information, or referring to the knowledge and understanding they have accumulated via their study of Unit 1 when specifying and justifying their choice of materials and processes to be used during product manufacture.

Assessment criterion (e)

Most students 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 student 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.

Statistics

Grade Boundaries 6933 Principles of Design, Planning and Prototyping

Grade	Max. Mark	A	B	C	D	E
Raw Boundary Mark	60	48	42	36	30	25
UMS	100	80	70	60	50	40

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