

Moderators' Report/
Principal Moderator Feedback

Summer 2013

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

As was the case last year, high quality work was seen in some cases while other examples of engineering tasks were less impressive but almost all work submitted for moderation was appropriate to the requirements of the 6933 course and offered students potential access to the full range of marks available.

Although a wide range of coursework projects were undertaken by students, Edexcel's approved titles such as PCB holder and mini-drill remained popular choices. It was encouraging to see students taking on more electronics based tasks, but there were a lot of cases where the level of challenge in these projects was lower than that expected for AS level. It was obvious from annotation that a good many students did not understand how their circuitry worked and many used 'found' circuits with no attempt to modify or improve them. It was interesting and unusual to see a few pneumatics based tasks being pursued where projects included pressing, crushing and reciprocating features.

Almost all of the work submitted for moderation was appropriate to the demands of the 6933 unit offering opportunities to access the full range of marks. Some students were unable to achieve the quality and skill levels necessary to gain high marks, but these were usually awarded marks appropriately by the centre assessor.

Most centres awarded marks broadly in line with the national standard, except in assessment criteria 'a', 'c' and 'd'.

Administration

Overall, administration tasks were carried out well by centres where most submitted samples of work on time, but a minority failed to include authentication sheets. The vast majority of centres submitted marks appropriately, but a few 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 assessment evidence could be found, which hindered moderation.

A few centre assessors made addition errors when totalling student marks and errors in transferring marks from mark sheets to OPTEMS.

Assessment Criterion (a)

In this section an increasing number of centres over-marked student work where engineering drawings were generated automatically from 3D CAD sketches, defeating the object of this criterion, which is to teach students how to understand construct engineering drawings and apply appropriate conventions and standards in order to achieve a solution to the task.

In this criterion there are eight marks to be gained for a student's understanding and skill in producing engineering drawings. It is expected that students will produce engineering drawings either by hand, or through the use of a 2D

drawing package, where in both approaches drawings should be done using personal skills. It is not acceptable to simply press a keyboard button to generate orthographic views from 3D CAD sketches. It was noticeable that many drawings had unrealistic dimensions such as 43.01, 23.553, 14.945 etc. and no units of measurement were included, indications of the practice just described. A minority of centre assessors credited design sketches in this section, or rewarded students significantly for attempts at freehand drawings in orthographic style, which failed to match any requirements of the assessment statements.

Assessment Criterion (b)

In this section students are adept at presenting the necessary information and the vast majority achieve good marks for planning a sequence of manufacturing tasks shown in an appropriate order and considering potential time taken for those tasks identified. Most students also added quality control checks and safety issues. 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. A very small minority of students wrote planning statements in retrospect, describing what had been done, rather than what would be done, which amounted to a backward looking 'diary of events' rather than a forward looking plan of action.

Although many students gathered research, this was often generic and failed to focus closely on the problem being tackled and was not often in evidence when specifications were written.

Assessment Criterion (c)

In this section, students continue to struggle to achieve high marks; many were highly rewarded but did not present alternative ideas that were detailed with technical information or were guided by or reviewed against measurable specification points.

Design ideas were often limited and superficial and students appeared to produce alternative ideas as part of an assessment requirement rather than offering genuine progression and creativity in their designing. Many students settled on the first idea produced and 'alternative ideas' focused on detailing part designs with no alternatives offered.

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.

Design development was generally weak and students did not illustrate how initial designs had been refined and developed into a final design proposal.

Sixteen marks are available in this section so it is expected that for high marks assessment requirements will be fulfilled.

Assessment Criterion (d)

As has been the case in all other years, the range of practical work seen was wide. At one end of the scale very high quality outcomes were presented that demonstrated excellent skill levels and at the other end of the scale, work was

often incomplete and did not match the final design proposal, or was simplistic, undemanding and inappropriate to AS level expectations.

Where students rely heavily on the use of CAM equipment it is important to ensure that there are opportunities to demonstrate other challenging skills and to show a range of high quality competencies. CAM equipment should be limited to no more than 50% usage in product manufacture.

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 evidence of soldering neatly, dealing with flying leads, anchoring circuit boards inside cases etc which are all creditworthy activities.

There remains an issue regarding the quality of photographic evidence presented by some centres. Centres are reminded that marks cannot be accepted on the strength of witness statements alone.

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 it is difficult to agree marks awarded by the centre. 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.

Assessment Criterion (e)

Most students provided appropriate evidence of oral presentations, which included hard copies of PowerPoint slides, CDs, 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.

Grade Boundaries

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