

Moderators' Report/ Principal Moderator Feedback

June 2011

GCSE Design & Technology
5EP01 Electronic Products
Controlled Assessment

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Introduction

This unit is being awarded for the first time in 2011. It has replaced the Major Project of GCSE Systems and Control.

Although students still complete a design and make activity they may take the traditionally linked route of designing and making one product or they may design one product and then start afresh on the make activity. A small number of schools used the latter model and this is entirely at schools discretion and should be taken in light of what is best for the centre and their students.

Generally candidates presented their folders in an ordered manner but centres should ensure that candidates have their name, centre number and candidate number on all sheets. The marks for 'Quality of manufacture' and 'Quality of outcome' are moderated on the strength of photographic evidence and the 'Assessors witness statement'. It was pleasing to see many candidates producing a photo-diary of their manufacture and this was supported by detailed witness statements. However, in a small number of cases photographic evidence could be improved and in order to ensure that candidates are moderated accurately, centres are advised to have 3 photographs in the CMRB showing clearly the completed product together with a clear view of both sides of the PCB. Detailed feedback of all stages is given below.

Design Activity

Analysing the brief

Most candidates were able to identify general points but in order to access higher marks they should be encouraged to ask questions that are pertinent to their design brief. For example, for a 'Shed Alarm' the following would be relevant:

How can I detect that someone is trying to enter the shed? Should the product be overt or covert? What would be the most suitable output device? Is there anything similar on the market? Together with more general points this should allow candidates to clarify their research and design needs.

Research

Many candidates produced too much work that was of a generic nature and not focused on their design needs. Relevance and selectivity are key issues in this section. One student produced in excess of 20 sheets and did not gain full marks. In contrast a number of candidates gained full marks by producing 3 sheets of relevant in-depth research. It should be noted that this section together with Specification, Review and Evaluation should consider issues of sustainability. Please see Topic 6.1 of the subject specification for further details.

Specification

This section tended to be marked too leniently. In order to access the higher marks candidates should ensure that their specification points are technical, measurable and justified wherever possible. Specifications will be a combination of general points that could apply to virtually any product relating to type of battery, access to battery, casing size/weight and material but more importantly points that are specific to their product. For example, saying that the 'product should be battery operated' is a low level response. Specifying the type of batteries to be used with justification and considering the sustainability issues of using rechargeable batteries is a high level response. Similarly a candidate producing bicycle indicators would not score highly by stating that the light must flash. Considering the rate at which it should flash and the distance at which it should be visible in the dark not only score well here but give the candidate measurable parameters that can be tested and evaluated at the end of their project. Please note that where candidates make a fresh start with their manufacture then the teacher should supply the specification.

Initial Ideas

Some very good work was seen that demonstrated candidates understanding of electronic components and how they could be combined to produce useful circuits. Some centres took a 'systems approach' and whilst this is perfectly acceptable candidates should progress to drawing actual circuits. Many centres would benefit by ensuring that candidates consider alternative solutions and not just minor variations on a theme. Some

centres concentrated too much on casing ideas and it should be noted that in all sections electronics account for approximately two-thirds of the marks.

Review

Although most candidates reviewed their ideas against specification points there was a lack of user group feedback. Issues of sustainability were only considered by the minority.

Communication

Centres did not feel confident in marking candidates highly in this area. The majority used freehand sketches, ICT, circuit and PCB software and 3D CAD with enough precision and accuracy to justify top box marks.

Development

Marking tended to be lenient in this section. Both electronics and casings should be developed in the proportions mentioned above. Many centres concentrated upon one area at the expense of the other. In this section candidates should be looking to refine and improve upon their initial ideas. Some good traditional and computer simulated modelling was seen but at the top end candidates would benefit by developing their PCB mask so that it is compact and with as few wire links as possible. Casing development should show how parts or components are fitted and whilst it does not need to be as detailed as the electronics, candidates should avoid merely producing better quality drawings of a previous casing design.

Final Design

This section tended to be over assessed. It is looking for technical detail relating to both the electronics and the casing. Candidates would benefit by itemising all parts and then giving details of the size and type of electronic components and naming specific materials for their casing. They should also list the processes and techniques that would be used to manufacture.

Make Activity

Production Plan

There appeared to be confusion as to what is required in this section. Some candidates planned all of the above sections, others only considered the manufacture of the electronics or the casing and in some instances it was obvious that it had been completed retrospectively. In order to score highly candidates should forward plan the stages of manufacture in the correct sequence for the electronics and the casing. They should also consider where specific forms of quality control should occur. Please note that on this course time planning is not required.

Quality of manufacture

A wide range of work was seen that in the main was accurately assessed. By the nature of our project work candidates will use a wide range of skills and processes. The key elements in this section are how independently candidates have worked together with the level of challenge of the task. As stated earlier the 'Assessor witness statement' was generally completed well and this helped moderators greatly. Where marking was generous it was usually due to the fact that the task did not present the level of challenge required for high marks. It is difficult to be prescriptive as so many outcomes are possible but as a general rule the use of one process device such as a transistor or thyristor cannot score highly. 555 timers and Op Amps offer slightly more challenge and logic gates more still but it is only when process devices are combined that the challenge is suitable for high marks. Clearly PIC's used with a single input and output would not offer the same level of challenge as multiple inputs and/or outputs. It should be noted that candidates can score full marks by using the process devices listed in Topics 1.5, 1.6 and 1.7 of the specification.

Quality of outcome

This section was generally well assessed by centres. However candidates would benefit by ensuring that their product is completed to a high standard. For example exposed wires should be insulated, PCB's and batteries should be held within the casing and long wires should be twisted.

Health and safety

Teachers' award marks in this section based on their observations of students during the make activity and no formal evidence is required. It was good to see that in most cases photographs of students manufacturing showed them taking precautions to work safely.

Testing and evaluating

Some excellent work was seen but this tended to be by the minority. Most students commented on the performance of their product but there was a lack of testing. In this section students should identify the main measurable points of their specification (3 is sufficient) and show evidence of testing these in order to justify the performance of their product. These tests should include user group feedback and consider issues of sustainability if high marks are to be achieved.

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