

Moderators' Report/ Principal Moderator Feedback

Summer 2015

Pearson Edexcel GCSE
Design and Technology
Electronic Products Unit 1 (5EP01/01)
Creative Design & Make

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Introduction

The standard of administration continues to rise with most Centres submitting work in a manner that allows moderators to access, view and assess students work in an organised and orderly manner. Students work is generally collated and secured and CMRB's are generally completed well. However there are still Centres who persist in fastening the CMRB to the student's folder and when it is removed, in some instances, there is no means of identifying the Centre or student. For clarification the information on folders and CMRB given last year is repeated below:

Folders – please ensure

- They are securely fastened.
- Students have their name, centre and student number on every sheet.
- They are compiled using the stage headings and in the order given in the CMRB.
- All pages are numbered.

CMRB - please ensure

- They are securely fastened separately from student's folders.
- The front page is completed including showing whether the Student has taken a combined or a separate route with design and make activities.
- Page annotation is given for every stage indicating where evidence can be found for each section of work.
- The sub-total and total marks are added correctly.
- The assessors witness statement has been completed for the electronics and casing.
- The declaration form is signed and dated by the teacher and the student.
- Good quality photographs are included that show both sides of the PCB as well as the finished product.

Further annotation may be provided that helps to support the mark awarded but repeating the descriptors for each stage is not required.

Thirty six marks are awarded in total for making and as well as ensuring that the CMRB has photographs it is recommended that students include a photo-diary in their folders that highlights the range of skills and processes used during the manufacture of the product. Further information is given in the making sections.

Details for each stage are given below:

Analysing the brief

The analysis was completed in a variety of formats but few students gained full marks. This section continues to be marked leniently by many Centres for two main reasons:

- Students produce a specification rather than an analysis. In some instances it is quite prescriptive and showed that the student had preconceived ideas.
- More commonly, students produced a vague analysis that could apply to virtually any product.

Students should be asking questions about their brief in order to identify research and design areas. Whilst it is accepted that many points will be general (e.g. what type of battery would be best? How will I access the battery? How will the circuit fasten in the case?), in order to gain all 3 marks they must consider the main salient aspects that relate directly to their brief. For example, a student with the brief of producing a 'Child's night light' would ask questions relating to how light levels could be sensed, what output(s) could be used and to what light level, if it should turn off after a given time, the age group and/or gender of the target group and if a 'theme' is appropriate. These, as outlined above, should be augmented with general questions relating to type of battery, portability, casing materials and so on.

Research

The key to good marks in this section is to ensure that the research is selective and focuses on the design needs identified in the analysis.

Unstructured 'research' into materials and components should be avoided as should questionnaires with general questions that do little to progress the students understanding of the design needs.

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

Marking was generally accurate in this section with most Centres understanding the requirements. Far more students are now justifying their specification points and this is to be encouraged for the vast majority of their points. In order to gain 'top box' marks students should ensure that some of their points are technical and measurable. Taking the 'Child's night light' again as an example a low level Specification point would state "it should be light- weight". At the other end of the spectrum the response may be "It should be portable and weigh no more than 'x' grammes as the child may wish to carry it to the toilet during the night". For those who combine the design and make tasks this has the added benefit of giving students something

tangible to test and evaluate at the end of their project. If a separate make activity is undertaken then the teacher should provide such points.

Initial Ideas

It was good to see that more Centres are guiding their students to concentrate upon the electronic element of this section. As with all designing and making sections the split of marks is approximately two-thirds for electronics and one-third for casings. This section has the most marks allocated to it in the whole of the Creative Design activity and students should spend an appropriate amount of time on it. What makes our subject so special is that we ask students to apply knowledge and not simply 'learn' it. We do not expect students to invent circuits but we are looking for them to apply knowledge learned during their study of Unit 2. Compiling circuits whilst considering suitable input, process and output devices is much better than students submitting overly complicated circuits of which they show little or no understanding. Students should avoid circuits that do not have a process device and more able students should demonstrate their knowledge by combining circuits or designing circuits with more than one process device.

Reviews

Some students prefer to integrate this section with their ideas and this is perfectly acceptable as long as it is clearly identified and the points relating to page annotation above are followed. Marking tended to be lenient as this section should also consider user group feedback and issues of sustainability.

Communication

Centre marks were generally accurate and on occasions a little severe as a wide range of techniques were used with precision and accuracy.

Development

Generally students moved both their circuit and casing designs on and some good work was seen. However in many cases the marking was lenient in this section. The key here is to ensure that the initial ideas have been developed using modelling and with the help of feedback from a user group. Many different pathways were taken through this section and high marks can be achieved providing students develop both areas to a final proposal. Some spent time developing their circuit to a final proposal whilst others had arrived at that point in their initial ideas. Better students refined their PCB layout by moving components, changing track widths, reducing links and decreasing the size. Others who did not score so highly accepted the programmes auto-route. A good number of students used bread boarding to test circuits and some made 2D card models of their casings. More able students should justify component values and include calculations if applicable. It is not feasible to expect all of the above to be completed but the final proposals for both the circuit and casing

should be developed on from the initial ideas remembering the two- third, one-third guidelines.

Final Design

Students should be encouraged to produce this as a separate section although credit was given where evidence could be found during development. Technical details should be given for all the components, materials and processes to be used during the manufacture of the PCB, casing. Clearly for us, this will consist largely of electronic components and students should ensure that the size or type is given. For the casing specific materials and processes should be given.

Production Plan

Improvements continue to be seen in this section with the majority of students producing plans that considered all stages of manufacture for the casing and circuit. In order to gain top box marks however students should consider specific forms of quality control. This should progress beyond a simple question to an actual statement of how the test will be conducted. For example after the circuit has been etched a statement such as 'use a multimeter to test tracts for continuity' rather than 'has it etched OK?'

Quality of manufacture

Some very good work was seen in this section and marking was generally accurate. By the nature of our project work students will use a wide range of skills and processes. The key elements in this section are;

- The range of skills and processes used
- The level of precision and accuracy
- The level of independence
- The level of challenge

The 'Assessor witness statement' was generally completed well and this helped moderators greatly. Where marking was lenient it was usually due to the fact that the task did not present the level of challenge required for high marks. As a general rule the use of one process device such as a transistor or thyristor cannot score in the top box as it does not offer the level of challenge. 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 one with multiple inputs and/or outputs.

Quality of outcome

It is pleasing to see so many students complete good quality products and the section was generally marked accurately. Quality is the key word in this section. Students

should use LED mounts, insulate bare wires, mount their circuit and battery within the casing, feed long wires through stress relief holes and twist loose wires or use ribbon cable. Students should be encouraged to include photographs in their folders that highlight these areas.

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

Many Centres still do not understand the requirement of this section. Although most students evaluated and included user group feedback there was a lack of actual testing and this should be the main focus. Please note that quality checks during manufacture, modifications and improvements and personal evaluations are not assessed. Checking the performance of the finished product, by conducting 2 or 3 relevant tests, is the area students should concentrate upon in this section whilst ensuring that user group feedback is also included.

Please note that QWC is assessed in this section only and marks cannot be awarded if no work is submitted in this section.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>

