GCSE
ENGINEERING

8852/CE: Practical engineering
Report on the Examination

8852
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General Comments

This was the second time that the Engineering Non-Examined Assessment (NEA) has been externally moderated, the first time being the first year of this GCSE in 2019, with the last two years being internally assessed by centres.

Teachers are advised to make use of the Teacher Online materials (TOLs) available on eAQA and make contact with their NEA adviser.

As moderators do not visit, centres should present good quality photographs and annotation to justify marks awarded. It is also useful if moderators are provided with photographic evidence of the work being made.

An increasing number of centres submitted work electronically, in some cases they included videos of the work being evaluated. Please ensure that such work is either in a PowerPoint or PDF format and sent to the moderator on a CD or memory stick.

Teacher Annotation

Teacher comments are very useful, being used by the moderator to confirm why a particular mark was awarded. It is most useful if annotation provides detail, and states exactly what a student has done and how this meets specified assessment criteria. General statements such as ‘worked within normal workshop rules’ is not sufficient to provide evidence of independent use of appropriate processes, tools and equipment, and using them safely with skill and accuracy.

Administration

The moderation period is limited, and centres are thanked for their cooperation in completing administrative tasks promptly. It is worth noting:

- With the online mark submission system, the sample of folders to be sent to the moderator is generated automatically. These folders should be sent to the moderator once the sample has been identified.
- Centres must complete a Centre Declaration Sheet and enclose this with the sample.
- Each student requires a completed Student Record Form, these should be secured to the front of each portfolio or be included with the folders/CD or memory stick when the sample is sent to the moderator.
- Portfolios should be individually fastened together in a logical order, to assist the moderation process. It is the centre’s responsibility to present students work in the best possible manner for moderation to ensure their potential is achieved.
- When assessing students’ work reference should be made at all times to the Assessment Criteria.

Problem solving

A change to the marking criteria for this year’s NEA was that problem solving only needed to be evident in the prototype design, with students not being required to demonstrate this in a final prototype.

This section gives students an opportunity to demonstrate their ability to analyse a given problem, imagine solutions to that problem, make use of modelling techniques, and communicate the decisions they make regarding their designs.

Problem solving occurs throughout the NEA with marks awarded for work that appears across the whole project; problem analysis, problem solving, modelling, communicating and the design for a final prototype.

Students achieving the highest marks for Problem Analysis showed discrimination when selecting material to include, while some students present material which is purely factual that they have not linked to the the products or systems they are designing, this is worthy of littlmark credit.

Students achieving the highest marks for Problem Solving produced a range of ideas that gave alternative solutions and explained the reasons behind their choice of solution; they explained their ideas in terms of Input, Process and Output.

Modelling was evidenced using card, electronic breadboard and using modelling software. Very little mathematical modelling was evident.

Decisions were explained and well communicated by students achieving the highest marks, while many students failed to explain the choices they considered and justify the decisions they made.

It was not necessary for students to manufacture a final prototype this year; marks were therefore not awarded for this category.

Drawings and conventions

This section gives students an opportunity to demonstrate their ability to develop illustrated design ideas which conform to sector-specific conventions, use CAD effectively and clearly annotate their drawings.

Students achieving the highest marks for development drawings developed engineering drawings of their solution which contained detailed annotation and evaluated their solution.

Good use of Computer Aided Design (CAD) was evident in many folders with students producing accurate rendered drawings that in some cases showed complex parts. However title blocks were generally not used to identify parts by many students or were incomplete if using certain pieces of software.

Students achieving the highest marks for the use of drawing conventions produced drawings which conformed to sector specific standards. Disappointingly, many lacked specific conventions and a great many did not include tolerances.

Production planning

This section gives students an opportunity to demonstrate their ability to produce and follow a production plan and explain the stages of production. Students achieving the highest marks produced and followed detailed plans which gave information about:

- materials, parts and components to be used
- processes to be used
- use of jigs/or fixtures and/or CNC programming
- tools, equipment and machinery to be used
- the sequence of production, including critical production and quality control points
- how quality would be checked and inspected
- health and safety factors.

Many students however, gave the use of jigs little or no mention, some missed opportunities by not mentioning the use of CAD drawings to reference or create templates and repeatability. The only quality control technique mentioned by many was its use to check for fit rather than using specific measurement and inspection techniques.

Where Health and Safety was mentioned by some students it was merely to wear goggles with no other hazards or risks identified.

A comprehensive production plan is at the heart of a well-planned and produced engineered prototype and time spent on the production of a detailed plan was well rewarded.

Engineering skills used

This section was reduced from 15 to 10 marks in this year's NEA. Students were not assessed on the skill of making but were required to show their 'intentions of prototypes', and demonstrate their understanding of the processes involved in making

The assessment did not require students to make a final prototype - instead, they had to show their understanding of the processes involved in making by writing about them. However, making skills are important for progression to future study, and for students' understanding, so students were encouraged to make wherever possible. Some centres did manage to allow students to make components for their prototype but marks were not allocated for this and any reference to making skills had been removed from the assessment criteria.

Some of the Engineering skills used were detailed by students to a greater depth than they might normally have done in the production planning stage, while others showed Understanding of a range of processes and materials' in additional sections in their portfolio. Students achieving the highest marks did give clear and detailed explanations of which alternative processes were considered and explained why particular methods were chosen, however many students only described one method of production rather than an alternative and in so doing limited the marks they could have been awarded. For example a student would mention the use of the laser cutter, but would not mention an alternative CNC/CAM device, or that it could be manufactured by hand.

Applying systems technology

This section gives students an opportunity to demonstrate their ability to identify and explain the systems they have used and produce block diagrams to represent them.

Some centres continued to award marks to students for producing a flow diagram for constructing their product. In this section students should produce a **systems block diagram** to help describe the engineering principles which have been used, **Input, Process, and Output** blocks should be used to describe the systems students use.

Students achieving the highest marks in this section produced system block diagrams for the systems used in their projects which included the sub systems used. They also produced detailed explanations of these systems which outlined how they controlled the function of the product.

Many students however only gave the Input, Process and Output for the electronic element of their project, and missed opportunities by not considering the mechanical options used. Little mention was given to feedback loops or sub systems. Many students gave a general description of how a circuit they intended to use worked but did not explain the rationale for its selection.

Testing and Evaluating

In this section there was no expectation to test a final made prototype, but an expectation in which students tested their prototype designs.

In the majority of portfolios analysis and evaluation was evident throughout the design process that took place in relation to prototype ideas and models. Those students achieving the highest marks did carry out testing of their prototype designs. This was often done by testing various iterations of models and through computer aided design and simulated testing. Circuits were simulated and many 3D modelling applications allowed testing.

Those achieving the highest marks also provided evidence of how they would test their prototypes, they explained what tests they would have used and outlined and evaluated their prototype design in terms of both systems and operation.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.