GCSE
ENGINEERING

8852/W: Paper 1
Report on the Examination

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General comments

The examination challenged less capable students but the more able and better prepared were able to score well.
It was pleasing to note that the vast majority of students attempted most of the questions on the paper. In many cases students have responded to questions with precision and accuracy, demonstrating clear evidence of effective planning and preparation of students by teachers. Schools are to be congratulated on this. For a few questions a number of students had responded to these questions without reading the questions carefully. To avoid this in the future, it is recommended students take the time to read over the questions before attempting to answer them so that simple errors and generic responses to longer questions are avoided. There were a number of instances where the responses throughout the paper were not detailed, specific or technical enough to gain the higher level of marks.
Communication skills shown by students were varied. Although many students wrote clearly and expressed themselves well, there were some whose handwriting and powers of expression were poor, this made it difficult to award many marks.
Many students were able to show good mathematical skills and many students scored well in the questions which asked them to demonstrate mathematical skills. However, at times, student's mathematics skills were more evident than engineering subject knowledge when achieving marks.
A considerable number of students found it difficult to score high marks in the manufacturing questions, such as riveting, testing a brake cable and the aluminium coat hook question. It was clear from student responses that some students knew about manufacturing stages but could not relate this knowledge to the question asked. Other responses demonstrated the lack of practical skills that could have been as a result of the change in teaching due to the recent pandemic.

Question 1

1.1 - 1.7
MCQ's. These were the best attempted questions on the paper.

1.1
The vast majority of students answered this question correctly.

1.2 and 1.3
Just over one third of students answered each of these questions correctly. Many gave the incorrect answer 'Polypropylene' for question 1.3.

1.4, 1.5, 1.6 and 1.7
were all answered correctly by more than three quarters of the candidates.

1.8
Most students were able to answer this question correctly achieving the full three marks.

Question 2

2.1
Where students had approached this question well and had written clear responses linked the properties of the saucepan, they were awarded full marks. However, many students gave generic answers such as ‘strong’, ‘heavy’ or ‘cheap’ without specific details or referring to the saucepans in the question. Students should be advised to ensure they know the engineering properties of at least the most commonly used materials.

2.2
Very few students achieved full marks on this question due to omitting marking out in their answer, a fundamental stage in manufacturing. However, many students achieved three marks as their responses showed accurate riveting knowledge after the marking out stage.

2.3
This was a straightforward question asking students about using a pillar drill, a common workshop machine, but surprisingly only half of student responses achieved the full four marks. Many students gave generic answers such as ‘it would be dangerous’ or ‘it would cause an accident’ and therefore were unable to achieve the top level.

2.4
Many students attempted this question with many achieving full marks. Although students are given full marks if the answer is correct with no calculations shown, there were quite a few students who just gave an incorrect answer and therefore were unable to be awarded any marks for their calculations as nothing was written down. If a student had stated an incorrect formula but had then gone on to use their formula correctly, they were awarded the calculation marks.

2.5
More than half the students achieved zero marks for this question as many were unable to rearrange the given formula to complete the calculation.

2.6
Students either answered this question well and achieved the full two marks, or they achieved zero marks. Again, many students gave generic answers such as ‘faster’ or ‘easier’ or their answer was written without referring to which machine they were writing about.

2.7
Although students could have given answers for any material, as the question didn’t specify a specific material, few students achieved full marks for this question. Many were not awarded any marks.

Question 3

Around a third of students achieved four or more marks in this question about bridges. Where students achieved high marks their answer was planned, detailed and showed clear technical information for both structural concrete and structural timber. However, it was clear from the responses that many students were unfamiliar with structural timber and answers were about timber in general. Many responses for the first section, properties, were again very generic, ‘strong’ being the favourite. Some responses given by students were repeated answers with the same

point being written for each section. Students should be advised to ensure they know the engineering properties and key terms for commonly used materials.
In addition, many responses compared structural concrete to structural timber, with the final comments being about which was the better choice rather than analysing the materials for its own merits.
A few students wrote about properties and advantages and disadvantages but didn't mention which specific material they were referring to. This made it difficult to award marks.

Question 4

4.1
Many students when attempting this question failed to recognise the details of the question about standard form. Many responses just mentioned 'bigger green houses', missing the key point of the question. This resulted in only one quarter of students achieving full marks. Students would be advised to take time to read the detail of the question.

4.2
This was a well attempted question with students attempting this question with confidence. It was one of the highest scoring questions, with many students achieving full marks. Where students failed to achieve the full four marks they had usually miscalculated or forgotten to add in the labour costs.

4.3
A straightforward and well answered question which used the student's response from the previous question if necessary. Some students made the question more complex by recalculating all the stages and working out 37% for each stage again rather than using their answer from the previous question. Many students who attempted it this way got confused and missed out steps which resulted in less than full marks being awarded.

4.4
Responses for this question covered the full mark range of marks, with a few students being awarded full marks. Where students had achieved top marks for this question, they had a range of clear factors given along with a thorough evaluation. Too many students failed to give examples in their response which limited their mark. In addition, a few students had just written a list of factors as their response, which limited them to a mark in the lowest mark band.

4.5
Many students were unable to name a suitable process for shaping polystyrene and often the explanation was generic and not why the process is suitable for polystyrene. It was often just a description of the process.

4.6
Responses for this question covered the full mark range of marks, with only a few students being awarded full marks. The reason many students were not awarded marks for this section was again mainly due to their responses being generic, such as 'strong', 'cheap', or just repeating back the information in the question, 'fibres reinforced'.

Question 5

5.1
A question about a lathe, a common engineering piece of equipment, but just over half of students were unable to name or describe either the chuck or the tail stock. Where a response showed a clear description of the function of a chuck or tail stock, students were awarded marks.

5.2
Many students were not specific enough with their answer just giving ‘drill’ as their response and writing that it ‘drilled holes’ as their response to the tools use. Only a few students achieved one mark or more in this question.

5.3
It was pleasing to see many students were able to be awarded full marks for this question. Where students identified that they needed to use Tan for this question they went on to correctly calculate the angle.

5.4
Responses for this question covered the full mark range of marks, some students answered this question well and showed good technical knowledge. But again, there were a reasonable number of students who gave generic responses such as ‘saw’ or who copied the process statement into the description box. These were not credited.

5.5
Responses for this question covered the full mark range of marks, with surprisingly only a few students being awarded full marks and around a fifth of students being unable name a suitable process. Centres are reminded to cover the full specification when teaching.

Question 6

6.1
The majority of students correctly identified the sine wave as an analogue wave.

6.2
Many students were able to identify an advantage of using a piezo sounder rather than a buzzer, but too many gave the generic answer ‘ louder’ rather than a range in sounds/tones.

6.3
Just over a third of students were able to give a clear answer for how an engineer would be able to predict performance in an electronic circuit. Many students appeared to not read the question correctly about predicting performance and gave answers about testing a circuit that included the use of voltmeters and ammeters.

6.4
It was pleasing to see many students achieved full marks for this question. Where students didn’t achieve full marks, it was too often because they did not state the correct units with their final answer.

6.5 Most students understood the need for a resistor in a circuit with over half of the responses giving a very clear definition worth the full two marks.

6.6
This question clearly showed that many students were unaware of what an ADC is and it's uses with over half of the responses being awarded zero marks for this question. ADCs are part of the specification and listed under 3.3.3 Electronics systems.

6.7
It was clear from the responses that students were unaware what a system diagram was. Many students drew a circuit diagram or a flowchart or combination of them both. Very few students achieved full marks on this question. Students should be aware of and be able to draw systems diagrams as they are an integral part of the course and are also needed in the NEA section of this specification.

6.8
Around half of students achieved full marks for this question. Where students failed to achieve any marks, they had again often written generic answers such as 'faster' or 'easier' and in addition didn't indicate which particular system their response referred to.

Question 7

7.1
A very well answered question, with the vast majority of students gave an answer worthy of one mark.

7.2
This question produced an even spread of marks with some students answering the question well and showing good technical knowledge of renewable energy. The students who were awarded a mark in the top mark band gave responses that were detailed, well thought out, planned and addressed all aspects of the question. It was pleasing to see many students using prior knowledge from other subjects when answering this question. Where students answered less well, they had made statements with limited comparison and often had generic environmental impact statements such as 'hurts wildlife', or 'not good for the environment'. A few students didn't compare wind and tidal energy and gave basic answers for the combined energy types. At the lower end of the mark range many students had difficulty expressing themselves with limited knowledge and often gave repeated unjustified responses.

Question 8

8.1
Many students achieved full marks on this question, where students failed to this was often due to them not working out the value for the radius and using the diameter in the equation given. Alternative methods using the diameter were credited.

8.2
Surprisingly only a few students knew that tension was the force applied to the inner brake cable. Many students incorrectly wrote compression as the force.

8.3 This question required students to communicate using a mixture of notes and sketches to gain maximum marks. It was one of the least attempted questions on the paper with a good number of students not even attempting it. Where students had attempted the question there was a wide

spread of marks across the available range. Where students had achieved top marks, their answers were clear, diagrams labelled, and they had a recognisable testing method. Top mark answers often mentioned stress and strain and had formula and graphs as part of their response. The testing of materials is fundamental key knowledge for engineering and has a dedicated section of the specification, 3.4 Testing and investigation.

8.4 and 8.5
This was a very pleasing question with many students able to draw and label the graph correctly. For question 8.5 where necessary the student's own drawn graph was used for reading off the value at 110N and therefore removing students from being penalised a second time for an incorrect answer in the previous part of the question.

8.6
Lots of students were able to state the material property of the inner cable that allowed it to stretch when force was applied.

Question 9

9.1
This was the least attempted question on the paper with lots of students not attempting it and only around a third of students being awarded a mark for their response. Many students named a polymer process or named a machine rather than a rapid prototyping process.

9.2
Surprisingly this was one of the poorest performing questions with more than half of students not being awarded a mark for this question despite attempting it. Again, many gave generic answers such as, 'fast', 'cheap' 'quick' which were not credited with a mark.

Mark Ranges and Award of Grades

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