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Examiners' Report/ Principal Examiner Feedback

Summer 2014

Pearson Edexcel Principal Learning in Engineering
EG308 Paper 01

Mathematical Techniques and Applications for Engineers

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General Comments

The June 2014 paper had a strong engineering context throughout and was designed to provide students with an opportunity to solve mathematical problems that may occur in the workplace. In this series, there were fewer mathematical errors, with some examples of students checking and proving their solutions. Overall, it appears that students have prepared well for this exam, demonstrating some confident working across the range of questions.

Question 1(a)(i)
Overall this was answered well, although some basic errors were noticed in some student transposition. Some students did not show the final stage in order to show the formula for r, leaving the transposed formula as r^3.

Question 1(a) (ii)
This was generally answered well. Students were able to substitute the values and calculate the value of 'r'. Where transposition errors were evident in (ii), final values were checked and normally followed through correctly.

Question 1(b) & (c)
Students are showing that they can apply the laws of logarithms correctly, although it appears some students had difficulty with the natural logarithm question and this was not attempted by some students. Some common problems were confusion in the process of handling the value of 1 in the equation. A minority attempted to solve the first question using a calculator and did not demonstrate a good understanding of the laws.

Question 2(a)
Students were generally able to calculate the gradient for the line. The value of the intercept was a problem for some students. Many read the intercept from the graph, without identifying that the x axis was not set at zero. The intercept had to be calculated from a point using the gradient previously determined. As a result the law of the line was incorrect for several students.

Question 2(b)
A number of students simply substituted values into the equation to try to obtain the value of t, without identifying that it was a quadratic and could be solved using the formula provided in the paper. Some confident working was observed with many students obtaining the correct value for t.

Question 2(c)
Some students partially factorised the equation, with many fully factorising to achieve the full marks for this question.

Question 3(a)
This question was generally well attempted and correctly answered by many students. Some misinterpreted the diagram and attempted to solve this as a right angle triangle using Pythagoras.

Question 3(b)
This was a straightforward Pythagoras problem although it could also be solved, as seen in some cases, using the sine rule. Both techniques were applied accurately by the students, although a number attempted to use the *tan* function to solve this.

Question 3(c)
Some students struggled with the two step process to convert the value to rad/s. At times the process was a mix of various conversions, with some dividing by 360.

Question 4(a)
Many students were able to select the formula required for this question and solve correctly. A number of students interpreted the section as rectangular, even though the stem indicated that a diameter bar was used, hence a round section.

Question 4(b)
The surface area of the sphere could be obtained using the formula provided. This was achieved by many students, although some used the diameter of the sphere instead of the radius.

Question 4(c)
Varying success was observed with this question, although most students were able to use the formula provided to obtain the two values.

Question 5(a-d)
This question was generally completed successfully by the students. Some mathematical errors were evident in the question to determine the mean. In addition, some students simply added the value of the diameters and divided by 7, rather than obtaining the totals for each diameter.

Question 6(a)
There was some confidence seen for the differentiation stage in this question. More students are showing an understanding of the technique and solved the question successfully.

Question 6(b)
This question was either not attempted by some students, or was not well attempted. A number of students realised that the maximum velocity would occur where the acceleration was zero and substituted this to get the correct value.

Question 6(c)
This question was answered well by students who were successful in (b). A number of students attempted to identify the maximum velocity by

observation of the graph. This did not give an accurate value, and demonstrated that some did not understand the Calculus techniques fully.

Question 6(d)

Performance of the students varied in this question. There was evidence of some good working with clear and confident integration. Many students missed this question out and for others simply substitution of numbers was evident, again identifying a lack of understanding of the integration technique.

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

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