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Summer 2012

Principal Learning

Engineering
EG308 Paper 01

Mathematical Techniques and Applications for Engineers

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Unit EG308/01

Mathematical Techniques and Applications for Engineers

General Comments

The June 2012 paper had a similar vocational context to previous papers, with all tasks being engineering related.
Across the scripts, there was clear evidence of some confident application of techniques and working, with an increase in the successful application of some of the more complex mathematical principles. In some cases, simple errors could have been avoided, if candidates had checked their working. There was little evidence across the scripts of this. Centres should remind candidates of this important procedure which could prove costly should marks be dropped.

Following marking of scripts, each task has been reviewed to highlight good practice and some common errors. This review is useful for planning and preparing candidates for future examinations in this subject.

Question 1(a)

This was generally answered well, although many candidates did not demonstrate the application of the laws of indices in the working as stated in the question.

Question 1(b)

Candidates transposed the formula well in this task.

Question 1(c) & (d)

The laws of logs were demonstrated by the majority of candidates. A few attempted to solve by calculator. In (d) many candidates simply subtracted the exponential values within the brackets; this lead to an incorrect solution.

Question 2(a)

This was answered well, with many candidates correctly calculating the plate volume. There were a large number of candidates that made basic errors in calculating the volume of the hole in the plate. This was mainly by using the formula for the circumference instead of the area of the circle.

Question 2(b)

Again, candidates made simple errors with the area of the circle. There were many examples where the circumference formula was used incorrectly to determine the diameter. Candidates should be reminded of the two formulae, their different uses and applications.

Question 2(c) (i) &(ii)

The gradient was obtained by most candidates, with minor errors in the intercept value due to incorrect reading from the axis scale. Where the law was obtained, this was correctly applied in (ii) to find the velocity. A number of candidates obtained the velocity by reading the graph rather than calculation as required in the task.

Question 3(a)

This task was answered correctly by many candidates. However, basic errors in processing were seen after the correct selection of the cosine rule formulae. As in previous series, there were some examples of attempting to solve the problem using Pythagoras or the sine rule.

Question 3(b)

Candidates demonstrated a sound understanding of plotting a sine wave and determining the unknown value. There were a few examples of incorrect angle position for the plots.

Question 4(a)

Many candidates attempted to solve this task by transposition, not identifying that the formula was a quadratic. There were some clear examples of selection and use of the quadratic formula to solve the problem. In addition, some trial and error was used, although not recommended for this task.

Question 4(b)

This was a straightforward task for most candidates, although a number had the formula reversed and divided by 60 and multiplied by 2π rather than multiplying by 60 and dividing by 2π.

Question 4(c)

Many candidates recognised this task as a pair of simultaneous equations. However, many simply tried to divide by the number of employees to solve the problem. Again, some trial and error by substituting values was seen.

Question 5(a-d)

This task was generally answered well by the candidates. The mode, median and mean was identified from the data provided. Many candidates correctly interpreted the change in fuse rating in (d) and stated the effect on these values.

Question 6(a)(i)

Many candidates simply substituted the value of t=2 in the equation and did not demonstrate calculus as required in the task.

Question 6(a)(ii)

In comparison to the previous task, candidates who substituted in (i), did differentiate in (ii) to obtain a value that would have been correct for velocity but not acceleration.

In (i) and (ii) there was also some confident working, with correct values obtained for velocity and acceleration.

Question 6(b)

There was evidence of some good working in this task. Some clear integration was seen, however a large number of candidates missed the question out or attempted to substitute the value of 5 into the equation without integration.

Grade Boundaries

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