Informal Feedback on the ME20021 Examination (May 2020)

In general, my part of the paper (Q3 and Q4) was done well. This is no surprise when one considers that a two-hour closed-book exam has been replaced by one that is a three-week open-book version.

There were so many scripts that had been written out carefully and fully that it made marking much easier than I had antipated — thank you for this. There were, nevertheless, others which looked like standard exam scripts with many crossings-out and arrows guiding the reader where to go next; that's poor style!

Nice to see some people typesetting their solutions using LaTeX. That's class!

There were a few scripts which looked as though either the paper was dark, or the lighting for the photo was poor, or a 2H pencil had been used. There may be further exams next year that are carried out in the same way as these were, so please make sure that there is a good contrast between the page colour and the pen colour.

Question 3.

Part (a). Generally this was answered well in terms of obtaining the correct summation. A few students seemed to think that Fourier's equation was being solved instead of Laplace's equation, hence the appearance of $e^{-n^2\pi^2 t}$, but magically the correct answer with two arbitrary constants was given despite the fact that Fourier's equation yields only one.

Part (b). Also done very well. The use of integration by parts was fine apart from the occasional few who dropped minus signs which then also reappeared magically on the next line — I assumed that this was a typo when copying out your workings tidily.

The reason for the cancellation of the exponentially growing solution wasn't always explained but should have been.

Part (c). The best answer to this question was simply that it is identical to the solution of parts (a) and (b) but with the coordinates, x and y, swapped. That was all that was needed and that is the mathematical thinking I was hoping to see. Some completely rederived the solution.

Part (d). I was impressed with this one. I haven't set anything like it before and thought that the three week examination period would be a good excuse to do so. There is one example in the notes which is similar but with a different boundary condition at $y = 0$. Although the great majority of students got this question right, some reproduced that example in the notes with the boundary condition used in the notes.

Question 4.

Parts (a) and (b). Bookwork. I shouldn't have kept that on the exam paper, but the results were necessary for the rest of the paper. So easy marks for you.

Part (c). Nicely done. Some decided to use a Fourier Sine Transform here and managed to get the right solution even though it is impossible that way! Some also started to use Separation of Variables, and I can make the same comment for that...

Part (d). The well-trodden path was trodden well once more. Nice work. The main problem was in identifying the direction in which each of the two waves travel. Thus $f(x - ct)$ travels at velocity c in the positive x-direction.