Examiners' Report
Principal Examiner Feedback

Summer 2022

Pearson Edexcel GCE
Further Mathematics (8FM0)
Paper 26 Further Mechanics 2

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2022
Publications Code 8FM0_26_2206_ER*

The small number of candidates for this paper covered the full range of ability. There were a few clear and confident responses, but many where the candidates showed little understanding of the topics covered.

Candidates should be reminded to read the questions carefully and ensure that they have responded to all the information provided. This was particularly true in question 2 where many candidates thought that this was a lamina, not a framework. It was also a problem in question 4(c) where candidates were given values for the speed and needed to find the corresponding values of the time in order to evaluate the integral.
The better candidates could see the links between the things that they were asked within a question, for example, they understood that the distance found in question 1(a) was relevant to what they needed to do in question 1(b).
In calculations the numerical value of g which should be used is 9.8. Final answers should then be given to 2 (or 3) significant figures – more accurate answers will be penalised, including fractions but exact multiples of g are usually accepted.
If there is a printed answer to show, as in 2(a) and 4(a), then candidates need to ensure that they show sufficient detail in their working to warrant being awarded all of the marks available and that they end up with ***exactly*** what is printed on the question paper with no errors in the working.
In all cases, as stated on the front of the question paper, candidates should show sufficient working to make their methods clear to the examiner and correct answers without working may not score all, or indeed, any of the marks available.
If a candidate runs out of space in which to give his/her answer than he/she is advised to use a supplementary sheet – if a centre is reluctant to supply extra paper then it is crucial for the candidate to say whereabouts in the script the extra working is going to be done.

Question 1

(a) Most candidates used the correct areas for a square and two triangles. They were asked to find the distance of the centre of mass from AD but many preferred to work from FE. Some made the required adjustment to obtain the given answer, but others just stopped. There were several arithmetic errors.
(b) Most candidates who attempted this part of the question understood that they needed to take moments about F. There were some fully correct solutions, but also several errors in the distances used, most notably using a in place of $3a$.

Question 2

This second centre of mass question proved to be far less accessible to the candidates, many of whom did not respond to the description of the diagram as representing a framework.

(a) The given answer should have given an indication to candidates if they had made a false start. This did not seem to be the case. The most common errors were:

- Using areas in place of lengths of rods.
- Including BC twice or not at all.
- Using the formula for the centre of mass of a semi-circular lamina in place of the formula for a semi-circular arc.
- Using an axis parallel to BC and not making the appropriate adjustment to find the distance asked for.

(b) Very few correct solutions were seen. Candidates needed a clear diagram to identify the required angle and to be using the correct distances. Some candidates found one of the relevant angles but in the absence of a clear diagram did not realise that there were two angles to be found.

(c) Very few candidates were able to offer a correct solution to this part of the problem. The most successful solutions used a moments equation with position vectors for the two components, as in the alternative method on the mark scheme.

Question 3

(a) There were several completely blank pages responses to this question and others which demonstrated little understanding of the problem. The majority of candidates did start with an attempt to resolve. Some responses included no mention of friction at all and the errors $R = mg\cos\alpha$ and $R\cos\alpha = mg$ were common. Those candidates who resolved successfully in both directions usually went on to reach the given answer.

(b) Many candidates obtained the correct answer, but the majority did so by starting again and resolving in both directions again. Very few realised that they simply needed to substitute $\mu = 0$ into the given answer for part (a).

(c) The majority of candidates did not understand what they needed to do to obtain this result. Some tried substituting values for μ to test the statement. Several candidates thought that the value $\frac{4}{3}$, mentioned in the question, should be part of the solution. A few worked backwards, showing that if $U < V$ then $\mu > 0$, which is true, but does not answer the question as written.

Question 4

(a) A few candidates did not appear to know how to differentiate an exponential function (see 8MA0 sections 6.2 and 7.1), but the majority understood that $a = \frac{\mathrm{d}v}{\mathrm{d}t}$. The main difficulty was that the question is a "show that.." question, so the solution needs a clear sequence $a = ... = ... = 2v + 1$ or an appropriate concluding statement. A few solutions did not mention v at all.

(b) Almost all candidates gave the correct solution.

(c) Several candidates set up an appropriate differential equation and attempted to integrate. There were some who could not integrate exponential functions, but the most common mistake was to use incorrect limits. The majority of candidates used 1 and 4 as their limits for t instead of using $v = 1$ and $v = 4$ to find the limits for t. The substitution of the correct limits into their integral was not always correct – some forgot to use the lower limit and others could not manipulate exponentials and logarithms. The question asked for an exact value, so a decimal approximation was not acceptable.

Pearson Education Limited. Registered company number 872828
with its registered office at 80 Strand, London, WC2R 0RL, United Kingdom