



Examiners' Report Principal Examiner Feedback

Summer 2024

Pearson Edexcel GCE
Further Mathematics (8FM0)
Paper 25 Further Mechanics 1

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Introduction

Overall, the quality of the scripts was very good, and the paper proved to be very accessible. There was no evidence of time being a limiting factor and candidates were very well prepared.

The paper was one of two halves where the first two questions proved to be very friendly with significant numbers of candidates able to score full marks on both. Questions 3 and 4 were more challenging but nevertheless again were very well answered.

In calculations the numerical value of g which should be used is 9.8, unless otherwise stated. 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.

N.B. If a question specifies a particular method to be employed, as in parts (a) and (c) of question 3, then in order to receive any credit, candidates must use that method as at least a part of their solution.

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.

Report on Individual Questions

Question 1

There were many fully correct responses and in part (a), almost all applied the conservation of momentum principle with the occasional use of impulse-momentum twice followed by elimination of the impulse. Errors were rare but when they did appear it was due to ignoring the different directions of motion.

In part (b), NEL was almost always used correctly, and any mistakes tended to be sign errors.

Part (c) was often correctly done even if the first two parts were wrong. A minority left their answer as $-5mu$ and lost the final mark and a few used a generic m instead of the actual mass in their impulse-momentum equation.

Question 2

Some candidates seemed tested by part (a) but answered part (b) perfectly.

In part (a), almost all used $84000/12$ for the driving force with the occasional loss of a zero and then set up a correct equation of motion which led to the correct answer.

Most candidates scored full marks in part (b), although there were a few sign errors in their equation of motion or a missing g . A minority omitted the component of the weight, a handful used \cos instead of \sin and a few used 84000 instead of $84000/V$ for the driving force. Almost all correctly rejected the negative value for V .

Question 3

In the first part, some candidates used $v^2 = u^2 + 2as$ and scored no marks but then went on to do part (c) using work-energy perfectly well. Occasionally some used an initial speed of zero but still used only h for the change in height. They often continued to answer the rest of the question correctly.

In part (b), a few candidates interpreted the question as requiring them to use the conservation of energy principle to answer this part and occasionally some candidates failed to answer this part correctly but, oddly, used the correct expression for the friction in (c). Most, however, were able to obtain a correct expression for the friction. Common errors were \sin/\cos confusion and the occasional use of \tan .

In the final part, the most common error was to omit the work done against friction and occasionally $mgh\sin\theta$ was used instead of $mgd\sin\theta$. Also the d was sometimes missed off the

$\frac{4}{15}mgd$ term and there were also sign errors in the work-energy equation.

Question 4

Part (a) was well answered with those candidates who used NEL making fewer sign errors than those who used CLM where the algebra was more difficult. Some candidates seemed unable to simplify their answer by collecting like terms.

In part (b), many candidates delayed the substitution of $e = \frac{3}{4}$ until the end and were left with extensive algebra which often led to errors. Some subtracted the KE terms the wrong way round and a few had f in the denominator.

In the third part, some candidates tried to use KE instead of comparing two velocities and some candidates who found that $f > \frac{7}{8}$ then changed it and gave $0 < f < \frac{7}{8}$ as their answer. Although $f > \frac{7}{8}$ was common, relatively few included $f \leq 1$ in their final answer.

