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Examiners' Report
October 2025

International Advanced Level in Mechanics M1

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General Comments

Overall, learners were able to access all seven questions on this paper and time did not appear to be a limiting factor. Learners were able to recall and use standard formulae and, although familiar with the context given in all questions, learners appeared to be less confident with question 4b and question 6.

In general, presentation of responses was good. However, when using an answer book it is important for learners to write their solution to each question on the assigned pages. Some learners used the answer book as a continuous notepad, completing the whole exam in the first seven pages. This risks a score of zero marks for later questions as learners present a blank response on the assigned pages.

Learners should be reminded that examiners do not see the learner's question paper. Any labelled diagrams or annotations made on the question paper will not earn credit unless they are transferred into the answer book.

Where a learner introduces their own notation, such as in question 6, a neatly labelled diagram in the answer book will help examiners to identify the terms being used and avoid any confusion.

If there is a printed answer to show, as in question 3(a), learners 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. It is evident that many understand these requirements, clearly establishing necessary equations, including at least one line of working and re-arranging their final answer, when necessary, to match the printed answer.

In all cases, as stated on the front of the question paper, learners 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.

In questions 2, 4, 5 and 6, the numerical value of *g* which should be used is 9.81ms^{-2}. 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 a learner runs out of space in which to give their answer, then they are advised to use a supplementary sheet – if a supplementary sheet is not used then it is crucial for the learner to say whereabouts in the script the extra working is going to be done.

Question 1

In general, learners were very familiar with the impulse-momentum equation, earning at least two marks out of the six available in parts (a) and (b) for using the correct mass with the corresponding velocities. Unfortunately, many learners, even at the top end, made sign errors which resulted in a significant loss of marks. Although sign errors were common in the impulse-momentum equations, they were rarely seen when using CLM.

This question defined the East and West directions, and each part asked learners to include the direction of motion after impact. Learners should be advised to respond with similar phrasing to that used in the question as those who referred to left/right or positive/negative did not earn the marks.

Question 2

This question involving moments distinguished between the grades with the most able learners producing fluent solutions and earning all available marks.

Part (a)

The most common approach to part (a) was to take moments about D to find the reaction at C and vice versa. The vertical resolution was also used successfully but other moments equations were less effective with sign and distance errors. Learners often made the sensible choice to use the notation R_C and R_D. In the cases where notation such as X and Y was used to represent the reaction forces, a simple diagram would have helped examiners to identify what each letter represented.

Part (b)

The first 2 marks in part (b) were available for a correct moments equation with the mass replaced by 3 kg. Most recognised that the two reactions were equal with only a handful trying to make use of an answer from part (a). Learners then wrote down a second moments equation or vertical resolution and solved to find x.

Learners were usually successful in both parts or neither part. Occasionally g was omitted from the weight but instances were rare. Those learners who forgot to include the weight of the rod, or who omitted a length in their moment's equation, could not access the method marks due to a missing term or a dimensionally incorrect equation.

Question 3

Part (a)

This was the most successful question on the paper, with learners at all ability levels obtaining the given answer in part (a) and earning all 5 marks. The most

popular approach was to equate fractions and rearrange. Those who made slips in their working were able to use the given answer to find and correct their error.

Part (b)

To start part (b) learners were required to sum the vectors and, although the process was attempted, a surprisingly common error identified by examiners was to give the sum of 11**j** and –3**j** as 7**j**. Learners confidently carried out the next two steps in a couple of neat lines: forming N2L and using Pythagoras to find the magnitude. The steps could be processed either way round and both were equally successful. Although rare, the most likely error in the last stage was to include a weight term in N2L which lost the method mark.

Question 4

Part (a)

Most learners made a strong start to this question, earning both marks for using a *suvat* equation to find the required height. Occasionally, learners lost the A mark for using 9.81ms^{-2} for *g* or for giving the answer as $\frac{5}{2}$ m instead of 2.5 m. Learners should be reminded to follow the instructions on the front of the paper when using a numerical value for *g*.

Part (b)

The 7 marks in part (b) proved challenging for learners at all levels with many blank responses. The first step required use of CLM at the instant when the blocks

collide, before examining the motion into the ground. Unfortunately, most learners ignored the collision and continued to use the speed of $7\,\text{ms}^{-1}$ instead of $6\,\text{ms}^{-1}$. Very little progress could be made in part (b) without understanding that the speed of the block must change as a result of colliding with another block. Using *suvat* for the second step was usually attempted but the method mark could not be awarded with an incorrect *u* and marks were also lost on occasions for failing to change 12 cm correctly into metres. The final method mark was for use of N2L with the most common errors being sign errors or ignoring the weight force.

Question 5

Part (a)

The most common successful approach to part (a) followed the main scheme, using *suvat* first to find acceleration and then N2L with particle Q. Some learners tried first to form an equation of motion for *P* and for Q but either realised that a different approach was required or abandoned the question entirely. Although most equations of motion were valid, a common error was to assume that both surfaces were rough and therefore include an additional term. The usual sign errors and sin/cos confusion were also present in responses.

Part (b)

Although many weaker responses offered no response to part (b), in general those who reached a value for the tension in part (a) also made a good attempt at part (b). It was common to see a correct value for the normal reaction followed by use of μR which usually secured 2 marks quite quickly. Many produced a valid equation of motion using their tension and acceleration from part (a). However, others showed a lack of understanding, using forces for the whole system but the

mass of only P. Occasionally learners lost the A mark for using 9.81ms^{-2} for g or for giving the answer as a fraction instead of 2 or 3 sf. Learners should be reminded to follow the instructions on the front of the paper when using a numerical value for g.

Question 6

There were many fully correct solutions from able learners, but weaker responses struggled to earn many marks. It was rare to see a neatly labelled diagram that could provide examiners with a clear indication of the notation being used. Instead, working was often muddled, with the letter T being re-used to represent more than one tension. When using an answer book, learners should be reminded that examiners will not see any of their annotations on the question paper. In questions such as this, it would be advisable for learners to draw their own diagram in the answer book to support their solution.

Part (a)

In part (a), most learners resolved vertically often achieving full marks as sin/cos confusion was rare.

Part (b)

Part (b) brought a variety of responses, and some abandoned the question entirely. Some learners did not appear to recognise that the horizontal portion of the string had any tension at all, and several found the tension in CD instead of BC.

Part (c)

Those who had found the tension in CD in earlier working were able to achieve full marks in part (c) provided that it was used correctly in relevant equations. There were various equations that could be used but the most popular solution was to

resolve horizontally for the whole system to find the tension in CD and then to substitute into the vertical resolution equation for the particle at C, thereby leading to an answer for the value of M.

It was not unusual for learners to achieve full marks in parts (a) and (c) and score zero in part (b), showing a lack of understanding for this context.

Question 7

This question on speed-time graphs was the longest on the paper but learners did not appear to be challenged by the time and most were able to secure a reasonable score with many achieving full marks.

Part (a)

The vast majority scored all 3 marks in part (a). Occasionally the second mark was lost with learners constructing the second graph 'within' the first. Others used a separate axis for each graph or failed to label the significant values on the time axis, but this was rare.

Part (b)

In part (b) there were several approaches to find the distance and then the acceleration and learners were usually confident and decisive in their approach. The only marks lost were usually due to arithmetical slips and processing errors.

Part (c)

The most successful learners in part (c) usually worked with the fraction $\frac{10}{27}$ as the acceleration rather than a decimal approximation. In this part, lost marks were

usually due to rounding decimals too early or truncating, which often led to an incorrect rounded answer of 54.1s instead of the exact answer of 54s. Those who observed symmetry found the second value with ease but others forgot it entirely.

The final part of the question brought with it a significant level of challenge as many struggled to find a successful solution process. The most common error was to use a *suvat* equation for the first 96 s without recognising that the acceleration was not constant throughout the time interval. Other errors followed from rounding answers too early in the solution or failing to complete the method by finding the difference between distances.