

Commentary on candidate evidence

The evidence for the following candidate responses achieved the marks given below.

Question 3

Response 1

The candidate was awarded **3/5 marks**.

- ◆ they chose the work/energy principle
- ◆ they ignored initial kinetic energy so could not gain ●¹
- ◆ rounding was not completed to 3 significant figures so was not awarded ●³

Question 5

Response 2

The candidate was awarded **5/5 marks**.

This evidence is included as an example of an alternative solution using a different approach.

Question 7

Response 3

The candidate was awarded **2/4 marks** and **2/2 marks**.

- Q7(a) The candidate worked in degrees; ●¹ and ●² was awarded but not ●³. This is followed by a calculator error so they could not achieve ●⁴.
- Q7(b) The candidate chose to use formula for velocity which did not require use of angle so correctly calculated speed velocity. Although the first calculation does not include +/-, this is implied in the following work and so was awarded 2/2 marks.

Response 4

The candidate was awarded **3/4 marks** and **1/2 marks**.

- Q7(a) The candidate was not awarded ●⁴ because of an error in solving a trig equation.
- Q7(b) The candidate stated the +/- but the comment did not relate specifically to 'second of these times' as asked in the question.

Question 8**Response 5**

The candidate was awarded **2/4 marks**.

This is an example of the frequent mistake made in answering this type of question.

Candidates must be aware that $v = \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2}$.

The candidate made a mistake in finding $\frac{dy}{dt}$ so **•3** was not awarded.

However, **•4** was available if $\frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}}$ **with substitution** was correct, as shown in this

instance.

Question 9**Response 6**

The candidate was awarded **2/4 marks, 3/3 marks** and **0/3 marks**.

Q9(a) **•1** and **•2** are awarded from method 2 solution in the marking instructions. However, several mistakes follow and the candidate tries to suggest the proof has been completed.

Q9(b)(i) The candidate gains all marks but no marks for 9(b)(ii).

Question 10**Response 7**

The candidate was awarded **4/6 marks** and **1/1 marks**.

Q10(a) The tabular layout for centres of mass questions is to be encouraged as good practice. **•1**, **•4**, **•5** and **•6** can be awarded.

Q10(b) It is good practice to include a diagram to indicate the angle that is being calculated.

Question 12

Response 8

The candidate was awarded **3/4 marks** and **4/4 marks**.

The candidate made a calculator error in (a) but was awarded full marks, with carry through, for (b). They used an alternative solution in (b) and note good practice in use of diagram to explain working.

Question 13

Response 9

The candidate was awarded **3/6 marks**.

Integration by substitution proves very demanding for candidates.

- ◆ ●¹, ●² (for resubstituting for x) and ●⁶ can be awarded
- ◆ errors and easing combine to make ●³, ●⁴ and ●⁵ unachievable

Question 14

Response 10

The candidate was awarded **5/5 marks**.

This evidence is included as an alternative solution. Candidates are encouraged to use any valid method, and it is always pleasing to see originality.

Question 15

This evidence is included as an example of how skill questions can be put in a mechanics content. This will be more evident post-2020 papers. Differential equations were introduced in 2015 and so are now well embedded in the course.

This question proved very challenging for candidates as the initial velocity is in the opposite direction to displacement and after 2 seconds the block of wood is moving back to fixed point.

Response 11

The candidate was awarded **3/5 marks** and **0/1 marks**.

Q15(a) ●¹, ●² and ●³ can be awarded

Response 12

The candidate was awarded **4/5 marks** and **0/1 marks**.

The candidate did not recognise that initial velocity was in the opposite direction to displacement.

Question 16(a)(i)**Response 13**

The candidate was awarded **2/2 marks**.

- ◆ graph is correct as it takes $t = 0$ for P and not Q as in marking instructions
- ◆ all other notation is correct