| Question | Scheme | Marks | AOs |
|---|---|---|---|
| 9(a)(i) | Equation of motion for $A$ | M1 | 3.3 |
| | $T - 12.7 = 2.5a$ | A1 | 1.1b |
| (ii) | Equation of motion for $B$ | M1 | 3.3 |
| | $1.5g - T = 1.5a$ | A1 | 1.1b |
| | | (4) | |
| (b) | Solving two equations for $a$ | M1 | 1.1b |
| | $a = 0.5$ | A1 | 1.1b |
| | | (2) | |
| (c) | $1 = \dfrac{1}{2} \leftarrow 0.5\, t^2$ | M1 | 3.4 |
| | $t = 2$ seconds | A1ft | 1.1b |
| | | (2) | |
| (d) | Valid improvement, see below in notes | B1 | 3.5c |
| | Valid improvement, see below in notes | B1 | 3.5c |
| | | (2) | |
| | | (10 marks) | |

| Continued question 9 |
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| **Notes:** |
| **(a)(i)**<br>**M1:**    For resolving horizontally for $A$<br>**A1:**    For a correct equation |
| **(a)(ii)**<br>**M1:**    For resolving vertically for $B$<br>**A1:**    For a correct equation |
| **(b)**<br>**M1:**    For complete correct strategy for solving the problem, setting up **two** equations in $a$, and then solving them for $a$<br>**A1:**    For $a = 0.5$ |
| **(c)**<br>**M1:**    For a complete method (which could involve use of more than one *suvat* formula) to give an equation in $t$ only<br>**A1:**    Ft from their $a$ to get time in seconds |
| **(d)**<br>**B1, B1**  for any two of<br>        e.g.  Include the dimensions of the ball in the model so that the distance it falls changes<br>        e.g.  Include the dimensions of the pulley in the model so string not parallel to table<br>        e.g.  Include a variable resistance in the model instead of taking it to be constant<br>        e.g.  Include a more accurate value for $g$ in the model |