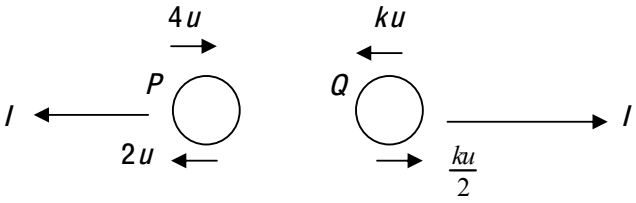
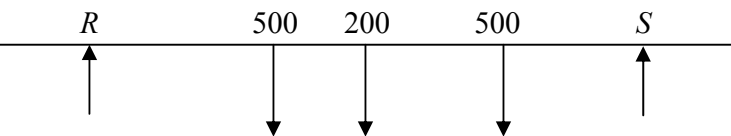
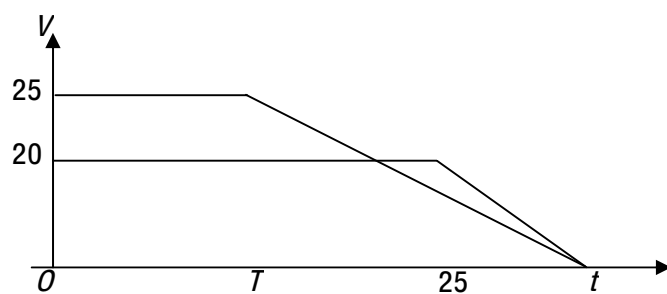


WME01/01: Mechanics M1

Question Number	Scheme	Marks
Q1	$(-4\mathbf{i} - 7\mathbf{j}) = \mathbf{r} + 4(-3\mathbf{i} + 2\mathbf{j})$ $\mathbf{r} = (8\mathbf{i} - 15\mathbf{j})$ $ \mathbf{r} = \sqrt{8^2 + (-15)^2} = 17 \text{ m}$	M1 A1 A1 M1 A1 ft [5]
Q2 (a)	 $4mu - 3mku = -2mu + 3mk \frac{u}{2}$ $k = \frac{4}{3}$	M1 A1 M1 A1cso (4)
Q2 (b)	For P, $I = m(2u - -4u) = 6mu$ OR For Q, $I = 3m(\frac{ku}{2} - -ku)$	M1 A1 A1 (3) (M1A1) [7]
Q3	$(\rightarrow) 100\cos 30 = F$ $F = 0.5 R \text{ seen}$ $(\downarrow) mg + 100\cos 60 = R$ $m = 13 \text{ kg or } 12.6 \text{ kg}$	M1 A1 A1 (B1) M1 A1 DM1 A1 [7]

WME01/01: Mechanics M1

Question Number	Scheme	Marks
Q4	 <p>$M(B),$ $500x + 500.2x + 200x3 = Rx5 + Sx1$ (or any valid moments equation)</p> <p>(\downarrow) $R + S = 500 + 500 + 200 = 1200$ (or a moments equation)</p> <p>solving for $x; x = 1.2$ m</p>	<p>M1 A1 A1</p> <p>M1 A1</p> <p>M1 A1 cso</p> <p>[7]</p>
Q5 (a)	 <p>Shape (both) Cross Meet on t-axis 25,20,T,25 Figures</p>	<p>B1 B1 B1 B1</p> <p>(4)</p>
(b)	<p>For $Q: 20\left(\frac{t+25}{2}\right) = 800$ $t = 55$</p> <p>For $P: 25\left(\frac{T+55}{2}\right) = 800$ solving for $T: T = 9$</p>	<p>M1 A1</p> <p>DM1 A1</p> <p>M1 A1</p> <p>DM1 A1</p> <p>(8) [12]</p>

WME01/01: Mechanics M1

Question Number	Scheme	Marks
<p>Q6 (a)</p>	$(\uparrow)v^2 = u^2 + 2as$ $0 = 14.7^2 - 2 \times 9.8 \times s$ $s = 11.025 \text{ (or 11 or 11.0 or 11.03) m}$ <p>Height is 60 m or 60.0 m ft</p>	<p>M1A1 A1 A1ft (4)</p>
<p>(b)</p>	$(\downarrow)v^2 = u^2 + 2as$ $v^2 = (-14.7)^2 + 2 \times 9.8 \times 49$ $v = 34.3 \text{ or } 34 \text{ m s}^{-1}$	<p>M1 A1 A1 (3)</p>
<p>(c)</p>	<p>$(\downarrow)v = u + at$ OR $(\downarrow)s = ut + \frac{1}{2}at^2$</p> $34.3 = -14.7 + 9.8t$ $t = 5$	<p>M1 A1 A1 (3)</p>
<p>Q7 (a)</p>	$F = \frac{1}{3}R$ $(\uparrow) R \cos \alpha - F \sin \alpha = 0.4g$ $R = \frac{2}{3}g = 6.53 \text{ or } 6.5$	<p>B1 M1 A1 M1 A1 (5)</p>
<p>(b)</p>	$(\rightarrow)P - F \cos \alpha - R \sin \alpha = 0$ $P = \frac{26}{45}g = 5.66 \text{ or } 5.7$	<p>M1 A2 M1 A1 (5)</p>
		<p>[10]</p>

WME01/01: Mechanics M1

Question Number	Scheme	Marks
<p>Q8 (a) Mark together</p> <p>(b)</p> <p>(c)</p>	<p>$(\downarrow)0.4g - T = 0.4a$ $(\uparrow)T - 0.3g = 0.3a$ solving for T $T = 3.36$ or 3.4 or $12g/35$ (N)</p> <p>$0.4g - 0.3g = 0.7a$ $a = 1.4 \text{ m s}^{-2}, g/7$</p> <p>$(\uparrow)v = u + at$ $v = 0.5 \times 1.4$ $= 0.7$</p> <p>$(\uparrow)s = ut + \frac{1}{2}at^2$ $s = 0.5 \times 1.4 \times 0.5^2$ $= 0.175$</p> <p>$(\downarrow)s = ut + \frac{1}{2}at^2$ $1.175 = -0.7t + 4.9t^2$ $4.9t^2 - 0.7t - 1.175 = 0$ $t = \frac{0.7 \pm \sqrt{0.7^2 + 19.6 \times 1.175}}{9.8}$ $= 0.5663.. \text{ or } -...$</p> <p>Ans 0.57 or 0.566 s</p>	<p>M1 A1 M1 A1 DM1 A1 (6)</p> <p>DM1 A1 (2)</p> <p>M1 A1 ft on a</p> <p>M1 A1 ft on a</p> <p>DM1 A1 ft</p> <p>DM1 A1 cao</p> <p>A1 cao (9) [17]</p>