Question Number	Scheme	Marks
5(a)	Moments about A:	M1
	$6g\,(\times 1)\times \sin 70° = T\sin 30°\times 2$	A1 A1
	T = 55 or 55.3 (N)	A1
		(4)
5(b)	Resolve horizontally: $T\cos 50° = R\,(=35.5)$	B1
	Resolve vertically:	M1
	$T\sin 50° = 6g \pm F$	A1
	Use of $F = \mu R$ $\quad (6g - T\sin 50° = \mu \times T\cos 50°)$	M1
	μ = 0.46	A1
		(5)
5(c)	$\tan\theta = \frac{"R"}{"F"}$	M1
	(θ =) 65° to the upward vertical oe (25° above the horizontal)	A1
		(2)
		(11 marks)

Notes	
(a) M1	A complete method to find T. Moments equations must have the correct number of terms and be dimensionally consistent (missing g is an A error). Condone sin/cos confusion and sign errors; allow incorrect angles.
A1	Unsimplified equation with at most one error.
A1	Correct unsimplified equation.
A1	2 or 3 sf only
(b) B1	Resolve horizontally. T does not need to be substituted but ft their value from (a).
M1	Resolve vertically: condone sign errors and sin/cos confusion but must use 40° or 50°
A1	Correct equation/ T does not need to be substituted but ft their value from (a).
M1	Use of $F = \mu R$. Must have found a value for F and R.
A1	0.46 or better (0.4638131241…)
Alt	**N.B.** For the first three marks if other methods attempted, e.g. resolve parallel and perpendicular to rod or take moments about B or C: B1 for first correct equation seen M1A1 for the "best" second equation seen N.B. M(B) $\quad 6g\,(\times 1)\times \sin 70° = R\times 2\times \cos 70° \pm F\times 2\times \sin 70°$
(c) M1	Correct use of trigonometry (E.g. $\tan\theta = \frac{R}{F}$ or $\frac{F}{R}$) with their numerical values (seen or implied).
A1	Correct angle and direction indicated (allow clear angle on a clear diagram) 65° or better (65.11751087…) or 25° or better (24.88248913…)

6. **In this question you must show all stages of your working.**
Solutions relying on calculator technology are not acceptable.

A particle P moves on the x-axis.

At time t seconds, $t \geqslant 0$

- the acceleration of P is $(2t - 3)\,\text{m s}^{-2}$ in the positive x direction
- the velocity of P is $v\,\text{m s}^{-1}$ in the positive x direction

When $t = 3$, $v = 2$

(a) Find v in terms of t.

(4)

The particle first comes to instantaneous rest at the point A and then comes to instantaneous rest again at the point B.

(b) Find the distance AB.

(6)

(Total for Question 6 is 10 marks)