Mark Scheme (Results)

January 2021

Pearson Edexcel International Advanced Level In Mechanics 3

Paper WME03/01

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

EDEXCEL IAL MATHEMATICS
General Instructions for Marking

1. The total number of marks for the paper is 75.

2. The Edexcel Mathematics mark schemes use the following types of marks:

   - M marks: method marks are awarded for 'knowing a method and attempting to apply it', unless otherwise indicated.
   - A marks: Accuracy marks can only be awarded if the relevant method (M) marks have been earned.
   - B marks are unconditional accuracy marks (independent of M marks)
   - Marks should not be subdivided.

3. Abbreviations

These are some of the traditional marking abbreviations that will appear in the mark schemes.

- bod – benefit of doubt
- ft – follow through
- the symbol $\surd$ will be used for correct ft
- cao – correct answer only
- cso - correct solution only. There must be no errors in this part of the question to obtain this mark
- isw – ignore subsequent working
- awrt – answers which round to
- SC: special case
- oe – or equivalent (and appropriate)
- dep – dependent
- indep – independent
- dp decimal places
- sf significant figures
- * The answer is printed on the paper
- ⎣ The second mark is dependent on gaining the first mark

4. All A marks are 'correct answer only' (cao.), unless shown, for example, as A1 ft to indicate that previous wrong working is to be followed through. After a misread however, the subsequent A marks affected are treated as A ft, but manifestly absurd answers should never be awarded A marks.

5. For misreading which does not alter the character of a question or materially simplify it, deduct two from any A or B marks gained, in that part of the question affected.

6. If a candidate makes more than one attempt at any question:
   - If all but one attempt is crossed out, mark the attempt which is NOT crossed out.
   - If either all attempts are crossed out or none are crossed out, mark all the attempts and score the highest single attempt.

7. Ignore wrong working or incorrect statements following a correct answer

General Principles for Mechanics Marking

(But note that specific mark schemes may sometimes override these general principles)

- Rules for M marks: correct no. of terms; dimensionally correct; all terms that need resolving (i.e. multiplied by cos or sin) are resolved.

- Omission or extra g in a resolution is an accuracy error not method error.

- Omission of mass from a resolution is a method error.

- Omission of a length from a moments equation is a method error.

- Omission of units or incorrect units is not (usually) counted as an accuracy error.

- DM indicates a dependent method mark i.e. one that can only be awarded if a previous specified method mark has been awarded.

- Any numerical answer which comes from use of $g = 9.8$ should be given to 2 or 3 SF.

- Use of $g = 9.81$ should be penalised once per (complete) question.

  N.B. Over-accuracy or under-accuracy of correct answers should only be penalised *once* per complete question. However, premature approximation should be penalised every time it occurs.

  Marks must be entered in the same order as they appear on the mark scheme.

- In all cases, if the candidate clearly labels their working under a particular part of a question i.e. (a) or (b) or (c),……then that working can only score marks for that part of the question.

- Accept column vectors in all cases.

- Misreads – if a misread does not alter the character of a question or materially simplify it, deduct two from any A or B marks gained, bearing in mind that after a misread, the subsequent A marks affected are treated as A ft

- Mechanics Abbreviations

M(A)	Taking moments about A
N2L	Newton's Second Law (Equation of Motion)
NEL	Newton's Experimental Law (Newton's Law of Impact)
HL	Hooke's Law
SHM	Simple harmonic motion
PCLM	Principle of conservation of linear momentum
RHS, LHS	Right hand side, left hand side.

Question Number	Scheme	Marks
1(a)	$V=\pi\int_1^a y^2\,dx$	
	$V=(\pi)\int_1^a \frac{1}{x^2}\,dx=(\pi)\left[-\frac{1}{x}\right]_1^a$	M1A1
	$V=\pi\left(1-\frac{1}{a}\right)*$	A1*
		(3)
(b)	$(\pi)\int xy^2\,dx$	M1
	$(\pi)\int_1^a \frac{1}{x}\,dx=(\pi)[ln\,x]_1^a=(\pi)\,ln\,a$	dM1A1
	$(\pi)\left(1-\frac{1}{a}\right)\bar{x}=(\pi)\,ln\,a$	
	$\bar{x}=\frac{a\,ln\,a}{a-1}$	M1A1
		(5)
		[8]

(a)

M1 Use of $\int y^2 dx$ AND an attempt at algebraic integration (power increasing by one)

A1 Correct integration. π not needed.

A1* Given result reached from fully correct working. If π not included from the start, its inclusion must now be justified.

(b)

M1 Use of $\int xy^2 dx$, must have substituted for *y*. π not needed.

dM1 Attempt at algebraic integration (*ln x* neds to be seen)

A1 Correct result after substitution of limits. π not needed.

M1 Use of $\frac{\int xy^2 dx}{\int y^2 dx}$. If π and/or ρ appear, they must appear consistently.

A1 Correct final answer. They lose this mark if they leave $1 - \frac{1}{a}$ in the denominator.

Question Number	Scheme	Marks
2(a)	$F = \dfrac{k}{(x+R)^2}$	M1
	$x = 0, F = mg \to mg = \dfrac{k}{R^2}$	M1
	$k = mgR^2 \to F = \frac{mgR^2}{(x+R)^2}$*	A1*
		(3)
(b)		
	$mv\dfrac{dv}{dx} = -\dfrac{mgR^2}{(x+R)^2}$ or $m\dfrac{d}{dx}\left(\dfrac{1}{2}v^2\right) = -\dfrac{mgR^2}{(x+R)^2}$	M1
	$\dfrac{1}{2}v^2 = -\int \dfrac{gR^2}{(x+R)^2}dx$	dM1
	$\dfrac{1}{2}v^2 = \dfrac{gR^2}{x+R}(+c)$	A1
	$x = R, v = U$	M1
	$\dfrac{U^2}{2} = \dfrac{gR^2}{2R} + c \to c = \dfrac{U^2 - gR}{2}$	A1
	$x = 0 \to \dfrac{1}{2}v^2 = gR + \dfrac{U^2 - gR}{2}$	
	$v^2 = U^2 + gR \to v = \sqrt{U^2 + gR}$	M1, A1
		(7)
		[10]
ALT1 (b)	$\dfrac{mv^2}{2} - \dfrac{mU^2}{2} = -m\int_R^0 \dfrac{gR^2}{(x+R)^2}\,dx$	M1
	$\dfrac{v^2}{2} - \dfrac{U^2}{2} = \left[\dfrac{gR^2}{x+R}\right]_R^0$	dM1 A1
	$\dfrac{v^2}{2} - \dfrac{U^2}{2} = \dfrac{gR^2}{R} - \dfrac{gR^2}{2R}$	M1 A1
	$v^2 = U^2 + gR \to v = \sqrt{U^2 + gR}$	M1, A1

Question Number	Scheme	Marks
ALT2 (b)	$mv\dfrac{dv}{dx} = -\dfrac{mgR^2}{(x+R)^2}$	M1
	$\displaystyle\int_U^V v dv = -\int_R^0 \frac{gR^2}{(x+R)^2}\, dx$	dM1
	$\left[\dfrac{v^2}{2}\right]_U^v = \left[\dfrac{gR^2}{x+R}\right]_R^0$	A1
	$\dfrac{v^2}{2} - \dfrac{U^2}{2} = \dfrac{gR^2}{R} - \dfrac{gR^2}{2R}$	M1 A1
	$v^2 = U^2 + gR \rightarrow v = \sqrt{U^2 + gR}$	M1, A1
		(7)

(a)

M1 Setting up an inverse square relationship between F and $(x + R)$ .Can be negative

Allow with $d = x + R$ or $k = GMm$

dM1 Clear use of $x = 0$ and $F = mg$ to find value of constant (k or GM)

A1* Given result reached with both M marks clearly earned. Must be positive

(b)

M1 Use of $mv\frac{dv}{dx}$ or $m\frac{d}{dx}(\frac{1}{2}v^2)$ to form equation. Condone sign error.

dM1 Separate variables to produce form ready for integration. Condone sign error.

A1 Correct integration. Sign must be correct now. Constant of integration not needed.

M1 Use of initial conditions in the result of an integration to find constant.

A1 Correct value for their c (for the side they place c on).

M1 Finding a value for v (or v^2) using $x = 0$. v^2 must come from a dimensionally correct expression.

A1 Correct expression for v.

ALT1 (b) uses the change in KE = work done

M1 Equates change in KE to the integral of F . Condone sign error

dM1 Integrates (power of $(x + R)$ must increase). Condone sign errors. Limits not needed.

A1 Correct integration. Sign must be correct now for their LHS. Limits not needed.

M1 Substitution of both limits R and 0 into definite integration.

A1 Correct limits, the correct way round for their equation.

Final two marks are the same as the main scheme.

ALT2 (b) uses definite integration

M1 Use of $mv\frac{dv}{dx}$ to form equation. Condone sign error.

dM1 Separate variables to produce form ready for integration. Condone sign error. Limits not needed.

A1 Correct integration. Sign must be correct now. Limits not needed.

M1 Substitution of both limits in definite integration. Must be 0, R, v and U

A1 Correct limits, the correct way round.

Final two marks are the same as the main scheme.

S.C. If they redefine x as the distance from the centre of the earth for (b) and use limits R and $2R$ correctly, full marks can still be gained in (b)

Question Number	Scheme	Marks
3(a)	$\cos\theta = \frac{4}{5}, \sin\theta = \frac{3}{5}$	B1
	$\omega = \pi$	B1
	$T_A \cos\theta - T_B \cos\theta = 600g$	M1A1
	$(T_A - T_B = 750g)$	
	$T_A \sin\theta + T_B \sin\theta = 600 \times \omega^2 \times (5 \sin\theta)$	M1A1
	$(T_A + T_B = 3000\pi^2)$	
	Solve their two equations simultaneously	dM1
	$T_A = 1500\pi^2 + 375g = 18000(N)$, $18500(N)$, 18kN, 18.5kN	A1
	$T_B = 1500\pi^2 - 375g = 11000(N)$, $11100(N)$, 11kN, 11.1kN	A1
		(9)
(b)	If the length of the arms increased, then the radius of the circle would increase.	B1
	Therefore the total tension would increase.	dB1
		(2)
		[11]

(a)

B1 Correct trig **used** anywhere.

B1 Angular speed **seen**.

M1 Attempt at vertical resolution. Allow mass as *m*

A1 Correct equation in θ. $m = 600$ needs to be used now or later.

M1 Attempt at horizontal resolution. Acceleration in either form. Attempt at *R* not needed. Condone sin/cos confusion and use of the same angle for both forces. Allow mass as m

A1 Correct equation in *w* and θ . *m* and *R* must be substituted (= 3 or 5sin θ may be seen later on)

dM1 Solve their equations to find at least one tension. Dependent on both previous M marks.

A1 Correct T_A (must be 2/3 s.f.)

A1 Correct T_B (must be 2/3 s.f.) (only penalise over accuracy on T_A if in both)

(b)

B1 Correct statement about the effect on the radius of the motion.

dB1 Conclusion that **total tension** would be greater (must reference the total tension) following a correct statement about the radius.

Question Number	Scheme					Marks
4(a)		Top cone	inside cone	C	S	
	Mass ratio	(-) 1	(-) 1	8	6	B1
	y distance	$5a$	$3a$	$2a$	$\bar{y}$	B1
	My	$5a$	$3a$	$16a$	$6\bar{y}$	
	$8\times 2a - 1\times 5a - 1\times 3a = 6\bar{y}$					M1A1 **ft**
	$6\bar{y} = 8a \rightarrow \bar{y} = \frac{4}{3}a$					A1
						(5)
(b)	$\tan\alpha = \frac{3}{8}$ $(\alpha = 20.556 \ldots.\ or\ 69.44 \ldots.)$					B1
	$\tan\beta = \frac{\frac{3a}{2}}{4a - \frac{4a}{3}} = \frac{9}{16}$ $(\beta = 29.357 \ldots\ or\ 60.642 \ldots.)$					M1A1ft
	$\alpha + \beta = \theta = 50^o$ (or better 49.91379…)					A1
	$or\ 180 - 69.44 \ldots - 60.64 \ldots. = 50°$					**(4)**
						[9]
ALT (b)	$\cos\theta = \frac{AB^2 + BG^2 - AG^2}{2\times AB \times BG}$					B1
	$BG^2 = (1.5a)^2 + (4a - \bar{y})^2$ $(= \frac{337a^2}{36})$ $AG^2 = (3a)^2 + (\bar{y})^2$ $(= \frac{97a^2}{9})$ $\{AB^2 = (1.5a)^2 + (4a)^2$ $(= \frac{73a^2}{4})\}$					M1
	$\cos\theta = \ldots\ldots\ldots\ldots\ldots\ldots = 0.6439 \ldots\ldots$					A1ft
	$\theta = 50^o$ (or better 49.91379…)					A1

(a)

B1 Correct mass ratio seen for 3 cones and *S*. Allow consistent (-)

B1 Correct distances for the 3 cones. (Allow distances from vertex ($3a$, $5a$, $6a$) or small plane face ($-a$, a, $2a$).) Condone missing (-)

M1 Dimensionally correct moments equation about any parallel axis. Must include 4 terms.

A1ft Correct moments equation follow through their distances.

A1 $\bar{y} = \frac{4}{3}a$ o.e.

SC if *a*'s are missing B1B0M1A1ftA0 is the maximum available

(b)

B1 Correct expression for $tan\,\alpha$ or α seen (either way round)

M1 Correct attempt to use their $\bar{y}$ to find $tan\,\beta$ (either way round)

A1ft Correct expression for $tan\,\beta$ or β (either way round). Ft their $\bar{y}$

A1 50^o or better (0.87 rad or better 0.87116……)

ALT (b) uses the cosine rule with triangle *ABG*

B1 Correct expression for cos θ in terms of *AB*, *AG* and *BG*

M1 Correct attempt to use their $\bar{y}$ to find *AG* and *BG*

A1ft Correct expression for cos θ. Ft their $\bar{y}$

A1 50^o or better

Question Number	Scheme	Marks
5(a)	$\frac{2mge_1}{2a}$ or $\frac{6mg(4a-e_1)}{4a}$	B1
	$mg+\frac{2mge_1}{2a}=\frac{6mg(4a-e_1)}{4a}$	M1A1
	Solve to find either extension	dM1
	$e_1=2a$ and $e_2=4a-e_1=2a*$	A1*
		(5)
ALT (a)	$mg+\frac{2mge_1}{2a}=\frac{6mge_2}{4a}$, $e_1+e_2=4a$	M1A1
	Solve simultaneously to find either extension	dM1
	$e_1=2a$ and $e_2=4a-e_1=2a*$	A1*
(b)		
	$mg+\frac{2mg(2a-x)}{2a}-\frac{6mg(2a+x)}{4a}=m\ddot{x}$	M1A1A1
	$\ddot{x}=-\frac{5g}{2a}x$ ∴ SHM	A1
		(4)
(c)	$\omega^2=\frac{5g}{2a}$	B1ft
	$v^2=\frac{5g}{2a}\left(a^2-\left(\frac{a}{2}\right)^2\right)$	M1A1
	$v=\sqrt{\frac{15ga}{8}}=\frac{\sqrt{30ga}}{4}$	A1 cso
		(4)
ALT (c)	$\frac{2mga^2}{4a}$ or $\frac{6mg(3a)^2}{8a}$ or $\frac{2mg(\frac{3a}{2})^2}{4a}$ or $\frac{6mg(\frac{5a}{2})^2}{8a}$	B1
	$\frac{2mga^2}{4a}+\frac{6mg(3a)^2}{8a}=\frac{2mg(\frac{3a}{2})^2}{4a}+\frac{6mg(\frac{5a}{2})^2}{8a}+\frac{mga}{2}+\frac{mv^2}{2}$	M1A1
	$v=\sqrt{\frac{15ga}{8}}$	A1
		(4)
		[13]

(a)

B1 Correct use of Hooke's law for either string. Must include an unknown extension.

M1 Resolve vertically, with two variable tensions and weight (M0 for setting both extensions as e)

A1 Correct equation.

dM1 Solve to find either extension.

A1* Correct extensions found for both strings, from fully correct working.

(b)

M1 Vertical equation of motion with two different variable tensions, weight and $m\ddot{x}$ (allow ma)

A1 Equation with at most one error (allow ma for this mark, which does not count as an error).

A1 Fully correct equation. Must now be $m\ddot{x}$

A1 $\ddot{x} = -\frac{5g}{2a}x$ $\therefore$ SHM. **Must have concluding statement.**

(c)

B1ft Use of their ω^2

M1 Complete method to find speed at $\frac{7}{2}a$ above A. Follow through their ω. Needs amplitude a and $x = \frac{1}{2}a$

A1 Correct equation. No follow through now.

A1 cso

ALT (a) using simultaneous equations

B1 Correct use of Hooke's law for either string. Must include an unknown extension.

M1 Resolve vertically with two tensions in e_1 and e_2 and weight AND give a second equation for $e_1 + e_2$

A1 Both equations correct.

dM1 Solves both equations simultaneously to find either extension.

A1* Correct extensions found for both strings, from fully correct working.

ALT (c)

B1 Use of correct EPE

M1 Complete method to find speed at $\frac{7}{2}a$ above A. Allow with $EPE = k\frac{\lambda x^2}{l}$. Must have all terms.

A1 Correct equation.

A1 Correct final answer

Question Number	Scheme	Marks
6(a)	$\frac{1}{2}mv^2 + mg(2a) = \frac{1}{2}m(3\sqrt{ag})^2 - mg(2a\cos 60^o)$	M1A1A1
	$(v^2 = 3ag)$	
	$T + mg = \frac{mv^2}{2a}$	M1A1
	$T = \frac{m(3ag)}{2a} - mg = \frac{mg}{2}$	dM1A1
	$T > 0$, therefore string remains taut and particle performs complete vertical circles.	A1
		(8)
(b)	From initial: $\frac{1}{2}mV^2 = \frac{1}{2}m(3\sqrt{ag})^2 + mg(2a - 2a\cos 60^o)$	M1A1
	Or from top: $\frac{1}{2}mV^2 = \frac{1}{2}m(3ag) + mg(4a)$	
	$(V^2 = 11ag)$	
	$T - mg = \frac{m(11ag)}{2a}$	M1A1
	$T = \frac{13mg}{2} < 7mg$. Tension less than critical value, so particle completes vertical circles.	A1
		(5)
ALT		**[13]**
(a)	$\frac{1}{2}mv^2 + mg(2a\cos 60^o - 2a\cos\theta) = \frac{1}{2}m(3\sqrt{ag})^2 \to v^2 = ag(7 + 4\cos\theta)$	M1A1A1
	$T - mg\cos\theta = \frac{mv^2}{2a}$	M1A1
	$T - mg\cos\theta = \frac{mag}{2a}(7 + 4\cos\theta)$ AND $\theta = \pi$ or $\cos\theta \geq -1$	dM1
	$T + mg = \frac{mg}{2}(3) \to T = \frac{mg}{2}$	A1
	$T > 0$, string stays taut and particle completes vertical circles.	A1
(b)	$\theta = 2\pi \to T - mg\cos 2\pi = \frac{mg}{2}(7 + 4\cos 2\pi)$	M1, M1
	$T - mg = \frac{m(11ag)}{2a}$	A1, A1
	$T = \frac{13mg}{2} < 7mg$. Tension less than critical value, so particle completes vertical circles.	A1

(a)

M1 Energy equation from projection to top of the circle. Must have 2 KE terms and a difference in GPE.

A1 Equation with at most one error.

A1 Fully correct equation.

M1 Equation of motion towards centre of circle at top. Allow acceleration in either form.

A1 Correct equation. Acceleration must be in form $\frac{v^2}{r}$. Condone $2a = r$ if substituted later

dM1 Eliminate v to form equation for T. Dependent on the first two M marks

A1 Correct unsimplified equation for T.

A1 Correct inequality with a concluding statement.

SC uses $T > 0$ without $T =$ For the last five marks:

M1 Finds resultant force at the top

A1 $F = \frac{m(3ag)}{2a} = \frac{3mg}{2}$

dM1 Compares their resultant force to the weight. Dependent on the first two M marks

A1 $\frac{3mg}{2} - mg > 0$ or $\frac{3mg}{2} > mg$

A1 Correct concluding statement that must include mention of their being tension in the string at the top

(b)

M1 Attempt energy equation from either initial position, or top, to the bottom of the circle.

A1 Correct equation.

M1 Equation of motion at the bottom of the circle. Allow in terms of V.

A1 Correct equation for tension, with V eliminated. Must have attempted to calculate V

A1 Correct tension and concluding statement.

ALT (a and b) using a general point on the circle

M1 Energy equation from point of projection to a general point. Must have 2 KE terms and a difference in GPE one of which is in θ

A1 Equation with at most one error.

A1 Fully correct equation.

M1 Equation of motion towards centre of circle at the general point. Allow acceleration in either form.

A1 Correct equation. Acceleration must be in form $\frac{v^2}{r}$. Condone $2a = r$ if substituted later

dM1 Eliminate v to form equation for T in m, a, g , θ AND set θ or $\cos\theta$ to evaluate T at the top. Dependent on the first two M marks.

A1 Correct unsimplified equation for T with θ now substituted.

A1 Correct inequality with a concluding statement.

(b)

M1, M1 Substitute for θ *or* $\cos\theta$ to evaluate T at the bottom

A1, A1 Correct unsimplified equation for T

A1 Correct tension and concluding statement.

Question Number	Scheme	Marks
7(a)	$0.5u = 4 \rightarrow u = 8$	B1
	$F_{max} = \frac{\sqrt{5}}{5} \times 0.5g \times \frac{\sqrt{45}}{7}\left(= \frac{3g}{14} = 2.1\right)$	B1
	$\frac{1}{2} \times 0.5 \times 8^2 = 0.5g(x+2)\sin\theta + F_r(x+2) + \frac{3x^2}{2 \times 2}$	M1A1A1
	$64 = 14(x+2) + 3x^2$	
	$3x^2 + 14x - 36 = 0$	M1
	$x = 1.8(m) \quad (1.84m)$	M1A1
		(8)
(b)	$T = \frac{3 \times 1.84}{2}(= 2.76)$	B1ft
	$0.5a = 2.76 + 1.4 - 2.1 \quad (= 2.06)$ Acceleration down slope, so particle does not remain at A.	M1A1
		(3)
		[11]

ALT (a)	$0.5u = 4 \rightarrow u = 8$	B1
	$F_{max} = \frac{\sqrt{5}}{5} \times 0.5g \times \frac{\sqrt{45}}{7}(= 2.1)$	B1
	$\frac{1}{2} \times 0.5 \times 8^2 = 0.5gd\sin\theta + F_r d + \frac{3(d-2)^2}{2 \times 2}$	M1A1A1
	$64 = 14d + 3(d-2)^2$	
	$3d^2 + 2d - 52 = 0$	M1
	$d = 3.8 \rightarrow x = 1.8(m) \quad (1.84m)$	M1A1
		(8)
ALT (b)	$T = \frac{3 \times 1.84}{2}(= 2.76)$	B1ft
	Upslope: $F_{max}(= 2.1)$, Downslope: $0.5g\sin\theta + T\ (= 4.16)$	M1
	$4.16 > 2.1$ so there is a resultant force down slope, so the particle does not remain at A	A1 **(3)**

(a)

B1 Initial speed seen.

B1 Maximum friction seen/used. Award if only seen in (b).

M1 Energy equation with KE, GPE, EPE and WD. If they split the motion up to find the speed when the string begins to extend (= 6 ms^{-1}) only award this mark once they have the equation containing EPE. Allow with $EPE = k\frac{\lambda x^2}{l}$.

A1 Equation with at most one error.

A1 Fully correct equation.

M1 Produce a 3 term in x or d equalling zero (see ALT). This is independent.

M1 Solve a 3 term quadratic to find the extension or distance travelled.

A1 Correct extension. Must be 2 or 3 s.f.

(b)

B1ft Correct expression for the tension at A ft their extension.

M1 Consider the three forces parallel to the plane.

A1 Correct conclusion from comparison of the three forces. Correct working with numerical values seen. Could be an acceleration or correct statement about the forces up/down the slope.

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