Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						6	6	7	7	/	0	1	Signature	

Paper Reference(s)

6677/01

Edexcel GCE

Mechanics M1

Advanced/Advanced Subsidiary

Friday 6 June 2014 – Afternoon

Time: 1 hour 30 minutes

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
Total	

Materials required for examination
Mathematical Formulae (Pink)

Items included with question papers
Nil

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. Calculators must not have the facility for symbolic algebra manipulation or symbolic differentiation/integration, or have retrievable mathematical formulae stored in them.

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature.
Check that you have the correct question paper.
Answer ALL the questions.
You must write your answer to each question in the space following the question.
Whenever a numerical value of g is required, take $g = 9.8$ m s^{-2} and give your answer to either two significant figures or three significant figures.
When a calculator is used, the answer should be given to an appropriate degree of accuracy.

Information for Candidates

A booklet 'Mathematical Formulae and Statistical Tables' is provided.
Full marks may be obtained for answers to ALL questions.
The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 7 questions in this question paper. The total mark for this paper is 75.
There are 28 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

You must ensure that your answers to parts of questions are clearly labelled.
You should show sufficient working to make your methods clear to the Examiner.
Answers without working may not gain full credit.

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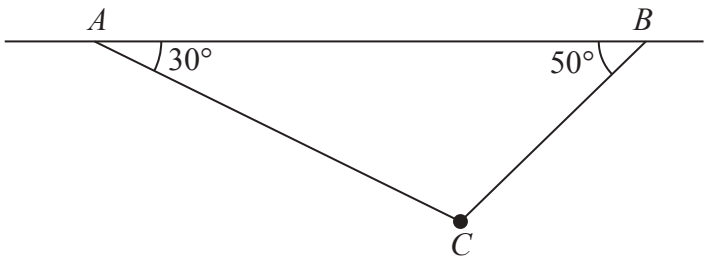

Figure 1

A particle of weight W newtons is attached at C to two light inextensible strings AC and BC. The other ends of the strings are attached to fixed points A and B on a horizontal ceiling. The particle hangs in equilibrium with AC and BC inclined to the horizontal at 30° and 50° respectively, as shown in Figure 1.

Given that the tension in BC is 6 N, find

(a) the tension in AC,

(3)

(b) the value of W.

(3)

Question Number	Scheme	Marks
1a	Resolving horizontally: $T\cos 30° = 6\cos 50°$ $T = 4.45$ (N), 4.5 (N), or better	M1A1 A1 (3)
b	Resolving vertically: $W = 6\cos 40° + T\cos 60°$ = 6.82 (N), 6.8 (N), or better	M1A1 A1 (3)
		[6]

Notes for Question 1

Question 1(a)

First M1 for resolving horizontally with correct no. of terms and both T_{AC} and '6' terms resolved.
First A1 for a correct equation in T_{AC} only.
Second A1 for 4.5 (N), 4.45 (N) or better. (4.453363194)
N.B. The M1 is for a *complete method* to find the tension so where two resolution equations, neither horizontal, are used, the usual criteria for an M mark must be applied to *both* equations and the first A1 is for a correct equation in T_{AC} *only* (i.e. W eliminated correctly)

Alternatives:

Triangle of Forces : $\frac{T_{AC}}{\sin 40^\circ} = \frac{6}{\sin 60^\circ}$ (same equation as → resolution) M1A1

Or

Lami's Theorem: $\frac{T_{AC}}{\sin 140^\circ} = \frac{6}{\sin 120^\circ}$ (same equation as → resolution) M1A1

Question 1(b)

First M1 for resolving vertically with correct no. of terms and both T_{AC} (does not need to be substituted) and '6' terms resolved.
First A1 for a correct equation in T_{AC} and W.
Second A1 for 6.8 (N), 6.82 (N) or better. (6.822948256)

Alternatives:

Triangle of Forces : $\frac{6}{\sin 60^\circ} = \frac{W}{\sin 80^\circ}$ M1A1

Or Lami's Theorem: $\frac{6}{\sin 120^\circ} = \frac{W}{\sin 100^\circ}$ M1A1

Or Resolution in another direction e.g. along one of the strings M1 (usual criteria) A1 for a correct equation.

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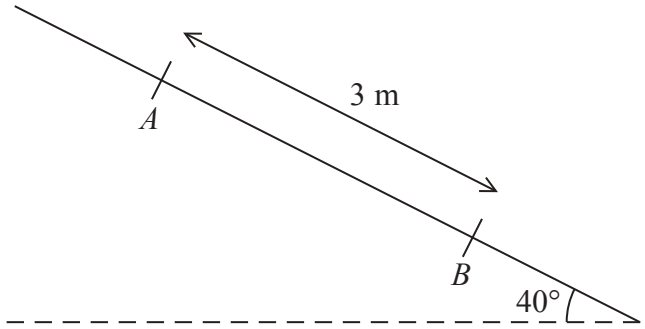

Figure 2

A rough plane is inclined at 40° to the horizontal. Two points A and B are 3 metres apart and lie on a line of greatest slope of the inclined plane, with A above B, as shown in Figure 2. A particle P of mass m kg is held at rest on the plane at A. The coefficient of friction between P and the plane is $\frac{1}{2}$. The particle is released.

(a) Find the acceleration of P down the plane.

(5)

(b) Find the speed of P at B.

(2)

Question Number	Scheme	Marks
2(a)	$R = mg\cos 40$	B1
	Use of $F = \mu R$	B1
	$mg\sin 40 - F = \pm ma$	M1A1
	$acc = 2.55$ (m s^{-2}) or 2.5 (m s^{-2})	A1 (5)
(b)	$v^2 = u^2 + 2as = 2 \times a \times 3$ Speed at B is 3.9 (m s^{-1}) or 3.91(m s^{-1})	M1A1 (2)
		[7]

Notes for Question 2

(Deduct only 1 mark in **whole question** for not giving an answer to either 2 sf or 3 sf, following use of g = 9.8)

Question 2(a)

First B1 for $R = mg\cos 40^o$

Second B1 for $F = \mu R$ seen or implied(can be on diagram)

M1 for resolving parallel to plane, correct no. of terms, *mg* resolved (*F* does not need to be substituted)

First A1 for a correct equation

Second A1 for 2.5 (ms^{-2}) or 2.55 (ms^{-2}) Must be **positive.**

S.C. If *m* is given a specific numerical value, can score max B1B1M1A0A0

Question 2(b)

M1 is for a complete method for finding speed (usually $v^2=u^2+2as$)

A1 for 3.9 (ms^{-1}) or 3.91(ms^{-1})

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3. A ball of mass 0.3 kg is released from rest at a point which is 2 m above horizontal ground. The ball moves freely under gravity. After striking the ground, the ball rebounds vertically and rises to a maximum height of 1.5 m above the ground, before falling to the ground again. The ball is modelled as a particle.

(a) Find the speed of the ball at the instant before it strikes the ground for the first time.

(2)

(b) Find the speed of the ball at the instant after it rebounds from the ground for the first time.

(2)

(c) Find the magnitude of the impulse on the ball in the first impact with the ground.

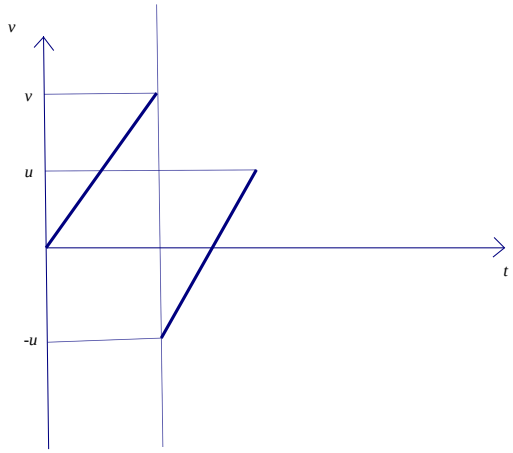
(2)

(d) Sketch, in the space provided, a velocity-time graph for the motion of the ball from the instant when it is released until the instant when it strikes the ground for the second time.

(3)

(e) Find the time between the instant when the ball is released and the instant when it strikes the ground for the second time.

(4)

Question Number	Scheme	Marks
3a	Using $v^2 = u^2 + 2as$: $v^2 = 4g$, $v = \sqrt{4g}$ or 6.3 or 6.26 (m s^{-1})	M1,A1 (2)
b	Rebounds to 1.5 m, $0 = u^2 - 3g$, $u = \sqrt{3g}$, 5.4 or 5.42 (m s^{-1})	M1A1 (2)
c	Impulse = $0.3(6.3 + 5.4) = 3.5$ (Ns)	M1A1 (2)
d	If speed downwards is taken to be positive:  First line Second line *-u,u,*	 B1 B1 B1 (3)
e.	Use of suvat to find t_1 or t_2, $\sqrt{4g} = gt_1 \quad t_1 = \sqrt{\frac{4}{g}} = 0.64$ s $\sqrt{3g} = gt_2 \quad t_2 = \sqrt{\frac{3}{g}} = 0.55$ s Total time = $t_1 + 2t_2 = 1.7$ s or 1.75 s	 M1A1 (t_1 or t_2) **DM**1A1 (4) **[13]**

Notes for Question 3

N.B. Deduct only 1 mark in **whole question** for not giving an answer to either 2 sf or 3 sf, following use of g = 9.8 or use of g = 9.81

Question 3(a)

M1 is for a complete method for finding speed (usually $v^2=u^2+2as$)

A1 for $v = 6.3$ (ms^{-1}) or 6.26 (ms^{-1}) or $\sqrt{4g}$ (ms^{-1}) (must be positive)

Allow 0= $u^2 - 4g$ or $v^2 = 4g$ but not 0= $u^2 + 4g$ or $v^2 = -4g$

Question 3(b)

M1 is for a complete method for finding speed

Allow 0= $u^2 - 3g$ or $v^2 = 3g$ but not 0= $u^2 + 3g$ or $v^2 = -3g$

A1 for 5.4 (ms^{-1}) or 5.42 (ms^{-1}) or $\sqrt{3g}$ (ms^{-1}) (must be positive)

Question 3(c)

M1 is for ± 0.3(their (b) $\pm$ their (a)) (unless they are definitely adding the momenta i.e. using $I = m(v + u)$ which is M0). *N.B. Extra g is M0*

A1 for 3.5 (Ns) or 3.50 (Ns) (must be positive)

Question 3(d)

First B1 for a straight line from origin to their *v which must be marked on the axis.*

Second B1 for a parallel straight line correctly positioned (*if continuous vertical lines are clearly included as part of the graph then B0)*

Third B1 for their $-u$ and u correctly marked, *provided their second line is correctly positioned*

N.B. A reflection of the graph in the t-axis (upwards +ve) is also acceptable

Question 3(e)

First M1 for use of *suvat* or area under their *v*-*t* graph to find either t_1 or t_2 or $2t_2$

First A1 for correct value for either t_1 or t_2 *(can be in terms of g at this stage or surds or unsimplified e.g.6.3/9.8)*

Second M1 **dependent on the first M1** for their $t_1 + 2t_2$

Second A1 for 1.7 (s) or 1.75 (s).

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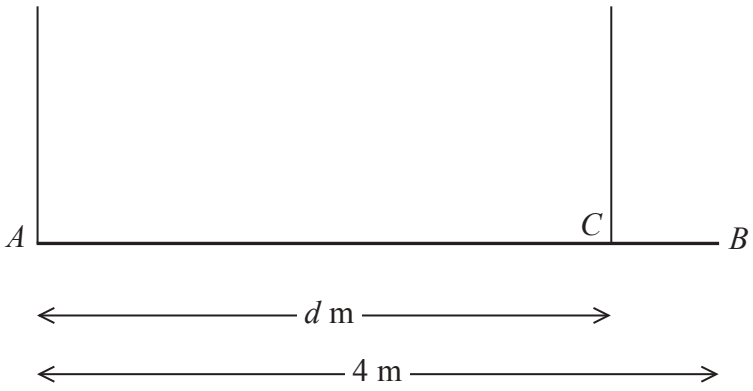

Figure 3

A beam AB has weight W newtons and length 4 m. The beam is held in equilibrium in a horizontal position by two vertical ropes attached to the beam. One rope is attached to A and the other rope is attached to the point C on the beam, where $AC = d$ metres, as shown in Figure 3. The beam is modelled as a uniform rod and the ropes as light inextensible strings. The tension in the rope attached at C is double the tension in the rope attached at A.

(a) Find the value of d.

(6)

A small load of weight kW newtons is attached to the beam at B. The beam remains in equilibrium in a horizontal position. The load is modelled as a particle. The tension in the rope attached at C is now four times the tension in the rope attached at A.

(b) Find the value of k.

(6)

Question Number	Scheme	Marks
4a	Resolving vertically: $T + 2T\left(=3T\right) = W$ Moments about A: $2W = 2T \times d$ Substitute and solve: $2W = 2\dfrac{W}{3}d$ $d = 3$	M1A1 M1A1 **DM1** A1 (6)
b	Resolving vertically: $T + 4T = W + kW \quad \left(5T = W\left(1+k\right)\right)$ Moments about A: $2W + 4kW = 3 \times 4T$ Substitute and solve: $2W + 4kW = \dfrac{12}{5}W\left(1+k\right)$ $2 + 4k = \dfrac{12}{5} + \dfrac{12}{5}k$ $\dfrac{8}{5}k = \dfrac{2}{5}, \qquad k = \dfrac{1}{4}$	M1A1 **ft** M1A1 **ft** **DM1** A1 (6)
		[12]

Notes for Question 4

N.B. In moments equations, for the M mark, all terms must be force x distance but take care in the cases when the distance is 1.

Question 4(a)

N.B. If *Wg* is used, mark as a misread. *If T and 2T are reversed, mark as per scheme NOT as a misread.*

First M1 for an equation in *W* and *T* and possibly *d* (either resolve vertically or moments about any point other than the mid-pt), with usual rules.

First A1 for a correct equation.

Second M1 for an equation in *W* and *T* and possibly *d* (either resolve vertically or moments about any point other than the mid-pt), with usual rules.

Second A1 for a correct equation.

Third M1, dependent on first and second M marks, for solving for *d*

Third A1 for *d* = 3 cso

N.B. If a single equation is used (see below) by taking moments about the mid-point of the rod, $2T = 2T(d - 2)$, this scores M2A2 (-1 each error)

Third M1, dependent on first and second M marks, for solving for *d*

Third A1 for *d* = 3 cso

Question 4(b)

N.B. If *Wg* and *kWg* are used, mark as a misread.

If they use any results from (a), can score max M1A1 in (b) for one equation.

If T and 4T are reversed, mark as per scheme NOT as a misread.

First M1 for an equation in *W* and a tension T_1 and possibly their *d* or their *d* and *k* (either resolve vertically or moments about any point), with usual rules.

First A1 **ft** on their *d*, for a correct equation.

Second M1 for an equation in *W* and **the same tension** T_1 and possibly their *d* or their *d* and *k* (either resolve vertically or moments about any point), with usual rules.

Second A1 **ft** on their *d*, for a correct equation.

Third M1, dependent on first and second M marks, for solving to give a numerical value of *k*

Third A1 for *k* = 1/4 *oe* cso

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5. A particle P of mass 0.5 kg is moving under the action of a single force $(3\mathbf{i} - 2\mathbf{j})$ N.

(a) Show that the magnitude of the acceleration of P is $2\sqrt{13}$ m s^{-2}.

(4)

At time $t = 0$, the velocity of P is $(\mathbf{i} + 3\mathbf{j})$ m s^{-1}.

(b) Find the velocity of P at time $t = 2$ seconds.

(3)

Another particle Q moves with constant velocity $\mathbf{v} = (2\mathbf{i} - \mathbf{j})$ m s^{-1}.

(c) Find the distance moved by Q in 2 seconds.

(2)

(d) Show that at time $t = 3.5$ seconds both particles are moving in the same direction.

(3)

Question Number	Scheme	Marks
5a	$\mathbf{F} = m\boldsymbol{a}$ **:** $3\mathbf{i} - 2\mathbf{j} = \mathbf{0}.5\boldsymbol{a}$ $\boldsymbol{a} = 6\mathbf{i} - 4\mathbf{j}$ $\lvert\boldsymbol{a}\rvert = \sqrt{6^2 + (-4)^2} = 2\sqrt{13}$ **(m s^{-2}) ****	M1 A1 M1A1 (4)
b	$\boldsymbol{v} = \boldsymbol{u} + \boldsymbol{a}t$**:** $\boldsymbol{v} = (\mathbf{i} + 3\mathbf{j}) + 2(6\mathbf{i} - 4\mathbf{j})$	M1A1 **ft**
	$= 13\mathbf{i} - 5\mathbf{j}$ m s^{-1}	A1 (3)
c	Distance $= 2\lvert\mathbf{v}\rvert = 2\sqrt{4+1} = 2\sqrt{5} = 4.47$ **(m)**	M1A1
		(2)
d	When $t = 3.5$**,** velocity of P is $(\mathbf{i} + 3\mathbf{j}) + 3.5(6\mathbf{i} - 4\mathbf{j}) = 22\mathbf{i} - 11\mathbf{j}$ Given conclusion reached correctly. E.g. $22\mathbf{i} - 11\mathbf{j} = 11(2\mathbf{i} - \mathbf{j})$	M1A1 **ft** A1 **(3)**
		[12]

Notes for Question 5

Question 5(a)

Either:
First M1 for use of **F** = *m* **a**
First A1 for **a** = 6**i** – 4**j**
Second M1 for $a = \sqrt{(6^2 + (-4)^2)}$ (Allow $\sqrt{(6^2 + 4^2)}$)
Second A1 for $a = 2\sqrt{13}$ (ms^{-2}) **Given answer**

Or:
First M1 for $F = \sqrt{(3^2 + (-2)^2)}$ (Allow $\sqrt{(3^2 + 2^2)}$)
First A1 $F = \sqrt{13}$
Second M1 for $\sqrt{13} = 0.5\,a$
Second A1 for $a = 2\sqrt{13}$ (ms^{-2}) **Given answer**

Question 5(b)
M1 for **(i + 3j) + (**2 x their **a**)
First A1 **ft** for a correct expression
Second A1 for 13**i** – 5**j** ; isw if they go on to find the speed

Question 5(c)
M1 for $2\sqrt{(2^2 + (-1)^2)}$ or $\sqrt{(4^2 + (-2)^2)}$
A1 for $2\sqrt{5}$ or $\sqrt{20}$ or 4.5 or 4.47 or better

Question 5(d)
M1 for **(i + 3j)** + (3.5 x their **a**) ,or possibly, their (b) + (1.5 x their **a**)
First A1 ft for a correct expression *of form a***i** + *b***j**
Second A1 for given conclusion reached correctly *e.g.* 22**i** -11**j**=11**(**2**i** - **j**) oe **Given answer**

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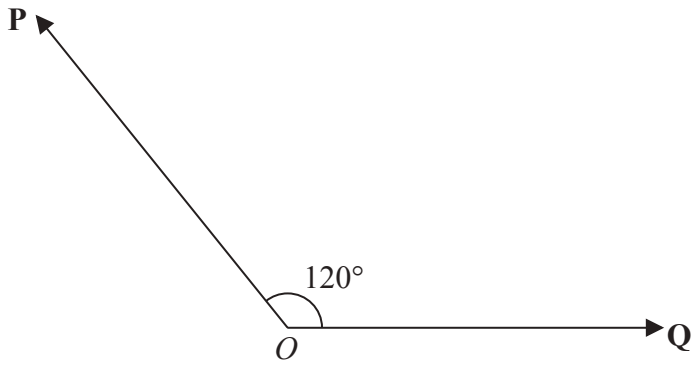


Figure 4

Two forces **P** and **Q** act on a particle at O. The angle between the lines of action of **P** and **Q** is 120° as shown in Figure 4. The force **P** has magnitude 20 N and the force **Q** has magnitude X newtons. The resultant of **P** and **Q** is the force **R**.

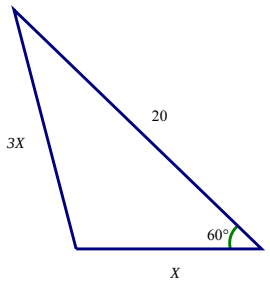
Given that the magnitude of **R** is $3X$ newtons, find, giving your answers to 3 significant figures

(a) the value of X,

(5)

(b) the magnitude of (**P** – **Q**).

(4)

Question Number	Scheme	Marks
6a	 Resolve and use Pythagoras $(X-20\cos 60)^2+(20\cos 30)^2=(3X)^2$ $8X^2+20X-400=0$ $X=\dfrac{-5\pm\sqrt{25+800}}{4}=5.93$ **(3 SF)**	 M1 A1 A1 M1A1 (5)
6a alt	Cosine rule $(3X)^2=20^2+X^2-2.20X\cos 60$ $8X^2+20X-400=0$ $X=\dfrac{-5\pm\sqrt{25+800}}{4}=5.93$ (**3SF**)	M1A1 A1 M1A1 (5)
b	$\lvert\mathbf{P}-\mathbf{Q}\rvert^2=20^2+X^2-2X\times 20\times\cos 120$ $\lvert\mathbf{P}-\mathbf{Q}\rvert=23.5$ (N) (**3SF**)	M1A1 **DM1** A1 (4)
6b alt	$\lvert\mathbf{P}-\mathbf{Q}\rvert^2=(X+20\cos 60)^2+(20\cos 30)^2$ $\lvert\mathbf{P}-\mathbf{Q}\rvert=23.5$ (N) (**3SF**)	M1A1 **DM1** A1 (4)
		[9]

Notes for Question 6

In this question a misquoted Cosine Rule is M0.
The question asks for both answers to 3 SF but only penalise under or over accuracy once in this question.

Question 6(a)

First M1 for a complete method to give an **equation in X only** i.e. producing two components *and* usually squaring and adding and equating to $(3X)^2$ (condone sign errors and consistent incorrect trig. in the components for this M mark **BUT the *x*-component must be a difference)**
First A1 for a correct unsimplified equation in *X only*
e.g, allow $(\pm(X - 20\cos 60^o))^2 + (\pm(20\cos 30^o))^2 = (3X)^2$
Second A1 for any correct fully numerical *3 term* quadratic = 0
Second M1(**independent**) for solving *a 3 term* quadratic
Third A1 for 5.93

Alternative using cosine rule:
First M1 for use of cosine rule with $\cos 60^o$ **(M0 if they use 120^o)**
First A1 for a correct equation unsimplified e.g, allow $\cos 60^o$ and $(3X)^2$
Second A1 for any correct fully numerical *3 term* quadratic = 0
Second M1(**independent**) for solving *a 3 term* quadratic
Third A1 for 5.93

Alternative using 2 applications of the sine rule:
First M1 for using $3X / \sin 60 = X / \sin a$ **AND**

Either: $X / \sin a = 20 / \sin (120^o - a)$
Or: $3X / \sin 60^o = 20 / \sin (120^o - a)$
(These could be in terms of b where $b = (120^o - a)$)

First A1 for two correct equations
Second A1 for $a = 16.778..^o$ (or $b = 103.221..^o$)
Second M1 for solving:
$X / \sin a = 20 / \sin (120^o - a)$ **or** $3X / \sin 60^o = 20 / \sin (120^o - a)$
with their a or b, to find X
Third A1 for 5.93

Question 6(b)

First M1 for use of cosine rule unsimplified with $\cos 120^o$ **(M0 if they use 60^o)**
First A1 for a correct expression for $|\mathbf{P} - \mathbf{Q}|$ in terms of X (does not need to be substituted)
Second M1, **dependent on first M1**, for *substituting for their X and solving for* $|\mathbf{P} - \mathbf{Q}|$
Second A1 for 23.5
Alternative using components:
First M1 for a complete method i.e. producing two components *and* squaring and adding (no square root needed) (condone sign errors and consistent incorrect trig. in the components for this M mark **BUT the *x*-component must be a sum)**
First A1 for a correct expression for $|\mathbf{P} - \mathbf{Q}|$
(e.g, allow $(\pm(X + 20\cos 60^o))^2 + (\pm(20\cos 30^o))^2$
Second M1, **dependent on first M1**, for *substituting for their X and solving for* $|\mathbf{P} - \mathbf{Q}|$
Second A1 for 23.5

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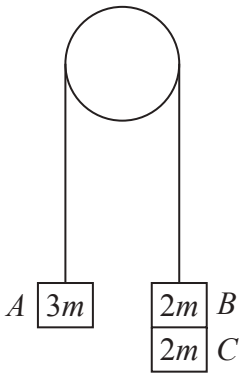

Figure 5

Three particles A, B and C have masses $3m$, $2m$ and $2m$ respectively. Particle C is attached to particle B. Particles A and B are connected by a light inextensible string which passes over a smooth light fixed pulley. The system is held at rest with the string taut and the hanging parts of the string vertical, as shown in Figure 5. The system is released from rest and A moves upwards.

(a) (i) Show that the acceleration of A is $\frac{g}{7}$

(ii) Find the tension in the string as A ascends.

(7)

At the instant when A is 0.7 m above its original position, C separates from B and falls away. In the subsequent motion, A does not reach the pulley.

(b) Find the speed of A at the instant when it is 0.7 m above its original position.

(2)

(c) Find the acceleration of A at the instant after C separates from B.

(4)

(d) Find the greatest height reached by A above its original position.

(3)

Question Number	Scheme	Marks
7(a)	$4mg - T = 4ma$	M1A1
	$T - 3mg = 3ma$	M1A1
	Condone the use of $4mg - 3mg = 4ma + 3ma$ in place of one of these equations.	M1A1
	Reach **given answer** $a = \frac{g}{7}$ correctly ***	A1
	Form an equation in T: $T = 3mg + 3\left(mg - \frac{T}{4}\right)$, $T = 3mg + 3m\frac{g}{7}$, or $T = 4mg - 4m\frac{g}{7}$	M1
	$T = \frac{24}{7}mg$ or equivalent, $33.6m$, $34m$	A1 (7)
(b)	$v^2 = u^2 + 2as = 2 \times \frac{g}{7} \times 0.7 = 1.96$, $v = 1.4$ ms^{-1}	M1A1 (2)
(c)	$3mg - T = 3ma$ $T - 2mg = 2ma$ $a = \frac{g}{5}$	M1A1 A1 A1 (4)
(d)	$0 = 1.96 - 2 \times \frac{g}{5} \times s$	M1
	$s = \frac{5 \times 1.96}{2g} = 0.5$ (m)	A1
	Total height = $0.7 + 0.5 = 1.2$ (m)	A1 **ft** (3)
Alt d	Using energy: $3mgs - 2mgs = \frac{1}{2}3m \times 1.4^2 + \frac{1}{2}2m \times 1.4^2$	M1
	$s = \frac{2.5 \times 1.96^2}{g} = 0.5$ (m)	A1
	Total height = $0.7 + 0.5 = 1.2$ (m)	A1 **ft** (3)
		[16]

Notes for Question 7

Question 7(a)(i) and (ii)

First M1 for resolving vertically (up or down) for $B+C$, with correct no. of terms.
First A1 for a correct equation.
Second M1 for resolving vertically (up or down) for A, with correct no. of terms.
Second A1 for a correct equation.
Third A1 for $g/7$, obtained correctly. **Given answer (1.4 A0)**

Third M1 for an equation in T only
Fourth A1 for $24mg/7$ oe or $33.6m$ or $34m$

N.B. If they omit m throughout (which gives $a = g/7$), can score max M1A0M1A0A0M1A0 for part (a) BUT CAN SCORE ALL OF THE MARKS in parts (b), (c) and (d).

Question 7(b)

M1 for an equation in v only (usually $v^2=u^2+2as$)
A1 for 1.4 (ms^{-1}) allow $\sqrt{(g/5)}$ oe.

Question 7(c)

First M1 for resolving vertically (up or down) for A or B, with correct no. of terms. (**N.B.** M0 if they use the tension from part (a))
First A1 for a correct equation for A.
Second A1 for a correct equation for B.
N.B. 'Whole system' equation: $3mg - 2mg = 5ma$ earns first 3 marks but any error loses all 3
Third A1 for g/5 oe or 1.96 or 2.0 (ms^{-2}) (*allow a negative answer)*

Question 7(d)

M1 for an equation in s only using their v from (b) and a from (c).
either $0 = 1.4^2 - 2(g/5)s$ or $1.4^2 = 0 + 2(g/5)s$
First A1 for $s = 0.5$ (m) correctly obtained
Second A1 **ft** for their 0.5 + 0.7 =1.2 (m)

Alternative using conservation of energy

M1 for an equation in s only, with correct number of terms, using their v from (b):-
$(3mgs - 2mgs) = ½\ 3m\ (1.4)^2 + ½\ 2m\ (1.4)^2$
First A1 for $s = 0.5$ (m) correctly obtained
Second A1 **ft** for their 0.5 + 0.7 =1.2 (m)