GCE

Further Mathematics B MEI

Y411/01: Mechanics A

AS Level

Mark Scheme for June 2024

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

MARKING INSTRUCTIONS

PREPARATION FOR MARKING

RM ASSESSOR

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *RM Assessor Online Training*; *OCR Essential Guide to Marking*.

2. Make sure that you have read and understood the mark scheme and the question paper for this unit. These are posted on the RM Cambridge Assessment Support Portal http://www.rm.com/support/ca

3. Log-in to RM Assessor and mark the **required number** of practice responses ("scripts") and the **number of required** standardisation responses.

MARKING

1. Mark strictly to the mark scheme.

2. Marks awarded must relate directly to the marking criteria.

3. The schedule of dates is very important. It is essential that you meet the RM Assessor 50% and 100% (traditional 40% Batch 1 and 100% Batch 2) deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.

4. **Annotations**

Annotation	Meaning
✓and ✗	
BOD	Benefit of doubt
FT	Follow through
ISW	Ignore subsequent working
M0, M1	Method mark awarded 0, 1
A0, A1	Accuracy mark awarded 0, 1
B0, B1	Independent mark awarded 0, 1
E	Explanation mark 1
SC	Special case
^	Omission sign
MR	Misread
BP	Blank Page
Seen	
Highlighting	

Other abbreviations in mark scheme	Meaning
E1	Mark for explaining a result or establishing a given result
dep*	Mark dependent on a previous mark, indicated by *. The * may be omitted if only one previous M mark
cao	Correct answer only
oe	Or equivalent
rot	Rounded or truncated
soi	Seen or implied
www	Without wrong working
AG	Answer given
awrt	Anything which rounds to
BC	By Calculator
DR	This question included the instruction: In this question you must show detailed reasoning.

5. **Subject Specific Marking Instructions**

a. Annotations must be used during your marking. For a response awarded zero (or full) marks a single appropriate annotation (cross, tick, M0 or ^) is sufficient, but not required.

For responses that are not awarded either 0 or full marks, you must make it clear how you have arrived at the mark you have awarded and all responses must have enough annotation for a reviewer to decide if the mark awarded is correct without having to mark it independently.

It is vital that you annotate standardisation scripts fully to show how the marks have been awarded.

If a candidate uses the answer space for one question to answer another, for example using the space for 8(b) to answer 8(a), then give benefit of doubt unless it is ambiguous for which part it is intended.

b. An element of professional judgement is required in the marking of any written paper. Remember that the mark scheme is designed to assist in marking incorrect solutions. Correct solutions leading to correct answers are awarded full marks but work must not always be judged on the answer alone, and answers that are given in the question, especially, must be validly obtained; key steps in the working must always be looked at and anything unfamiliar must be investigated thoroughly. Correct but unfamiliar or unexpected methods are often signalled by a correct result following an apparently incorrect method. Such work must be carefully assessed. When a candidate adopts a method which does not correspond to the mark scheme, escalate the question to your Team Leader who will decide on a course of action with the Principal Examiner.

If you are in any doubt whatsoever you should contact your Team Leader.

c. The following types of marks are available.

M

A suitable method has been selected and applied in a manner which shows that the method is essentially understood. Method marks are not usually lost for numerical errors, algebraic slips or errors in units. However, it is not usually sufficient for a candidate just to indicate an intention of using some method or just to quote a formula; the formula or idea must be applied to the specific problem in hand, e.g. by substituting the relevant quantities into the formula. In some cases the nature of the errors allowed for the award of an M mark may be specified.
A method mark may usually be implied by a correct answer unless the question includes the DR statement, the command words “Determine” or “Show that”, or some other indication that the method must be given explicitly.

A

Accuracy mark, awarded for a correct answer or intermediate step correctly obtained. Accuracy marks cannot be given unless the associated Method mark is earned (or implied). Therefore M0 A1 cannot ever be awarded.

B
Mark for a correct result or statement independent of Method marks.

E
A given result is to be established or a result has to be explained. This usually requires more working or explanation than the establishment of an unknown result.

Unless otherwise indicated, marks once gained cannot subsequently be lost, e.g. wrong working following a correct form of answer is ignored. Sometimes this is reinforced in the mark scheme by the abbreviation isw. However, this would not apply to a case where a candidate passes through the correct answer as part of a wrong argument.

d. When a part of a question has two or more 'method' steps, the M marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several B marks allocated. (The notation 'dep*' is used to indicate that a particular mark is dependent on an earlier, asterisked, mark in the scheme.) Of course, in practice it may happen that when a candidate has once gone wrong in a part of a question, the work from there on is worthless so that no more marks can sensibly be given. On the other hand, when two or more steps are successfully run together by the candidate, the earlier marks are implied and full credit must be given.

e. The abbreviation FT implies that the A or B mark indicated is allowed for work correctly following on from previously incorrect results. Otherwise, A and B marks are given for correct work only – differences in notation are of course permitted. A (accuracy) marks are not given for answers obtained from incorrect working. When A or B marks are awarded for work at an intermediate stage of a solution, there may be various alternatives that are equally acceptable. In such cases, what is acceptable will be detailed in the mark scheme. If this is not the case please, escalate the question to your Team Leader who will decide on a course of action with the Principal Examiner.

Sometimes the answer to one part of a question is used in a later part of the same question. In this case, A marks will often be 'follow through'. In such cases you must ensure that you refer back to the answer of the previous part question even if this is not shown within the image zone. You may find it easier to mark follow through questions candidate-by-candidate rather than question-by-question.

f. Unless units are specifically requested, there is no penalty for wrong or missing units as long as the answer is numerically correct and expressed either in SI or in the units of the question. (e.g. lengths will be assumed to be in metres unless in a particular question all the lengths are in km, when this would be assumed to be the unspecified unit.)

We are usually quite flexible about the accuracy to which the final answer is expressed; over-specification is usually only penalised where the scheme explicitly says so.

- When a value is given in the paper only accept an answer correct to at least as many significant figures as the given value.
- When a value is not given in the paper accept any answer that agrees with the correct value to 2 s.f. unless a different level of accuracy has been asked for in the question, or the mark scheme specifies an acceptable range.
  NB for Specification A the rubric specifies 3 s.f. as standard, so this statement reads "3 s.f".

Follow through should be used so that only one mark in any question is lost for each distinct accuracy error.
Candidates using a value of 9.80, 9.81 or 10 for g should usually be penalised for any final accuracy marks which do not agree to the value found with 9.8 which is given in the rubric.

g. Rules for replaced work and multiple attempts:
   - If one attempt is clearly indicated as the one to mark, or only one is left uncrossed out, then mark that attempt and ignore the others.
   - If more than one attempt is left not crossed out, then mark the last attempt unless it only repeats part of the first attempt or is substantially less complete.
   - if a candidate crosses out all of their attempts, the assessor should attempt to mark the crossed out answer(s) as above and award marks appropriately.

h. For a genuine misreading (of numbers or symbols) which is such that the object and the difficulty of the question remain unaltered, mark according to the scheme but following through from the candidate's data. A penalty is then applied; 1 mark is generally appropriate, though this may differ for some units. This is achieved by withholding one A or B mark in the question. Marks designated as cao may be awarded as long as there are no other errors.
   If a candidate corrects the misread in a later part, do not continue to follow through. E marks are lost unless, by chance, the given results are established by equivalent working. Note that a miscopy of the candidate's own working is not a misread but an accuracy error.

i. If a calculator is used, some answers may be obtained with little or no working visible. Allow full marks for correct answers, provided that there is nothing in the wording of the question specifying that analytical methods are required such as the bold "In this question you must show detailed reasoning", or the command words "Show" or "Determine". Where an answer is wrong but there is some evidence of method, allow appropriate method marks. Wrong answers with no supporting method score zero. If in doubt, consult your Team Leader.

j. If in any case the scheme operates with considerable unfairness consult your Team Leader.

6. Award No Response (NR) if:
   - there is nothing written in the answer space

   Award Zero '0' if:

- anything is written in the answer space and is not worthy of credit (this includes text and symbols).

Team Leaders must confirm the correct use of the NR button with their markers before live marking commences and should check this when reviewing scripts

Question			Answer	Marks	AOs	Guidance
1	(a)		$15\sin\theta = 7\sin 70°$	M1	3.1b	Resolving both forces in y-direction and forming an equation. *Allow sign errors* **OR** Vector triangle $\frac{\sin\theta}{7} = \frac{\sin 110°}{15}$
			$\Rightarrow \theta = 26.0$	A1 [2]	1.1	Accept 0.454 (rad)
	(b)		$15\cos\theta - 7\cos 70°$	M1	1.1	Resolving both forces in x-direction and combining *Allow sign errors, and sin/cos interchange if consistent with (a)* **OR** Vector triangle $\frac{R}{\sin(70-\theta)} = \frac{15}{\sin 110°}$ $(= \frac{7}{\sin\theta})$ $R^2 = 15^2 + 7^2 - 2(15)(7)\cos(70-\theta)$ $15^2 = R^2 + 7^2 - 2R(7)\cos 110°$ etc
			Magnitude of resultant force is 11.1 (N)	A1 [2]	1.1	11.086656 cao and www *e.g. A0 if obtained from* $\theta = -26$

Question			Answer	Marks	AOs	Guidance
2	(a)		e.g. $[E]=\left[\frac{1}{2}mv^2\right]=\mathrm{M(LT^{-1})^2=ML^2T^{-2}}$	B1 [1]	1.1	Could be from any known expression which calculates work done or an energy (like GPE, EPE) *Correct answer www earns B1. B0 for* $\mathrm{kg\ m^2s^{-2}}$
	(b)		$\mathrm{ML^2}$	B1 [1]	1.1	
	(c)		$[\omega]=\mathrm{T^{-1}}$	M1	1.2	Stated or clearly implied *e.g.* $[\omega^2]=(\mathrm{T^{-1}})^2$ *or* $[\omega^2]=\mathrm{T^{-2}}$ *Just* $\mathrm{ML^2T^{-2}=ML^2(T^{-1})^2}$ *is M0, but this earns M1 when accompanied by* $E=\frac{1}{2}I\omega^2$ [RHS] $=\mathrm{ML^2(T^{-1})^2}$ *earns M1*
			So $\left[\frac{1}{2}I\omega^2\right]=\mathrm{ML^2\cdot T^{-2}}=[E]$ (as required)	A1 [2]	1.1	Conclusion stated *(may be just a tick)* after correct working
	(d)		$\mathrm{T=(MLT^{-2})^{\alpha}L^{\beta}(ML^2)^{\gamma}}$	M1	1.1	Substituting dimensional expressions into formula; accept **their** expression for $[I]$; may already be expanded. *Allow use of units kg, m, s* *Allow one error in* [*mg*] *and/or* [*r*]
			[$-2\alpha=1$, so] $\alpha=-\frac{1}{2}$	B1	1.1	
			$\alpha+\gamma=0$ $\alpha+\beta+2\gamma=0$	M1	1.1a	Equating indices of M and L *Allow one error (but not omission).* *Three correct equations imply first M1*
			$\beta=-\frac{1}{2},\gamma=\frac{1}{2}$	A1 [4]	1.1	*Correct values www imply M1A1* *Three correct values www imply M1B1M1A1*
	(e)		$r=\frac{1}{2}\times 0.8\ \ (=0.4)$	B1	3.1b	
			$1.47=k\sqrt{\frac{0.32}{(1.5)(9.8)\times\frac{1}{2}(0.8)}}$	M1	3.4	Substituting data *FT indices (at least two non-zero)* *Allow* $r=0.8$ *and one other error*
			$\Rightarrow k=6.30(131\ldots)$	A1 [3]	1.1	A1 FT for answer of 8.91 (when $r=0.8$ used) Otherwise cao

Question			Answer	Marks	AOs	Guidance
3	(a)					*Forces must have arrows and be appropriately labelled* *No extra forces, but condone components shown as well*
			Contact force at A resolved into separate normal and frictional components; allow friction either vertically upwards/downwards.	**B1**	**3.3**	*(Forces at A)* Accept contact force as a single force (neither horizontal nor vertical nor parallel to beam) *B0 for friction labelled* μR_A
			80 N force vertically downward at centre of beam (G) and contact force at C perp. to beam in the correct direction.	**B1** **[2]**	**3.3**	*(Forces elsewhere)* Must be clear right angle or with right angle marker present. *Max B1 if same label used for two forces*
	(b)	(i)	Take the frictional force at A to be F vertically downwards. Resolving vertically: $R_C \sin 60° = F + 80$	**M1**	**1.1**	Resolving to obtain an equation involving F, e.g. Parallel to AB: $R_A \sin 60° = 80 \cos 60° + F \cos 60°$ Perp to AB: $R_C = 80 \sin 60° + F \sin 60° + R_A \cos 60°$
			Moments about A: $R_C(2) = 80(3.5 \sin 60°)$ [$R_C = 70\sqrt{3} = 121.24$] [$105 = F + 80$]	**M1**	**1.1**	A moments equation, e.g. about C: $R_A(2 \cos 60°) + F(2 \sin 60°) = 80(1.5 \sin 60°)$ G: $R_A(3.5 \cos 60°) + F(3.5 \sin 60°) = R_C(1.5)$ B: $R_A(7 \cos 60°) + F(7 \sin 60°) + 80(3.5 \sin 60°) = R_C(5)$ *No omitted or extra terms. Allow sign errors and sin/cos confusion. Allow* R_C *in wrong direction (e.g. vertical).* *In moments about C, note that* $2 \cos 60° = 1$
			$F = 25$	**A1** **[3]**	**2.1**	**AG** Fully correct working *With F upwards leading to* $F = -25$ *they must say 'so the magnitude is 25' or 'i.e. 25 downwards' to earn A1*

Question			Answer	Marks	AOs	Guidance
3 cont	(b)	(ii)	$R_A = R_C \cos 60°$ $R_A = 35\sqrt{3}\ (= 60.6217\ldots)$ Magnitude $= \sqrt{25^2 + \left(35\sqrt{3}\right)^2}$ Magnitude is 65.6 (N)	**M1*** **M1dep*** **A1** **[3]**	**1.1** **1.1** **1.1**	Resolving horizontally **OR** Obtaining another resolving or moments equation, involving R_A, not credited in (i) **OR** Obtaining R_A from equation(s) credited in (i), possibly using $F = (\pm)25$ *This M1 can be awarded for work done in (i)* Obtaining a value for R_A and using $\sqrt{F^2 + {R_A}^2}$ Accept $\sqrt{4300}$
	(c)		$\tan\theta = \frac{25}{R_A}$ $22.4(109\ ...)°$ below the horizontal.	**M1** **A1** **[2]**	**1.1** **2.5**	Equation for a relevant angle e.g. $\tan\alpha = \frac{R_A}{25}$, $\sin\theta = \frac{25}{65.6}$ etc *Provided magnitude in (b)(ii) has been calculated from perpendicular components, allow M1 for using the same components to find an angle* Or $67.5(890\ ...)°$ from the downward vertical *Direction must be clear*
	(d)		$\mu \geq \frac{F}{R_A}$ $\mu \geq \frac{5\sqrt{3}}{21}$, $\mu \geq 0.412$	**M1** **A1 FT** **[2]**	**3.4** **1.1**	$F = \mu R_A$ or $F \leq \mu R_A$ seen or implied *Must be their forces at A (on diagram) or their values* FT is $\mu \geq \frac{25}{\text{their } R_A}$ *Allow exact or approximate form. Allow >* *Allow inequality stated in words.* *Ignore upper limit, e.g. A1 for* $0.412 \leq \mu \leq 1$
	(e)		Both F and R_A would increase so the magnitude must increase.	**B1** **[1]**	**2.4**	Must acknowledge that **both** components increase. **OR** Other reasonable explanation, e.g. *'Moment of weight (about C) increases, so the total contact force must increase to balance it'*

Question			Answer	Marks	AOs	Guidance
4	(a)		Because $e<1$.	B1 [1]	1.2	Allow $e \neq 1$ *Must refer to 1, e.g. 'Because $e=\frac{4}{5}$' is B0* *Ignore any further comments*
	(b)		Let the velocities of A and B after the first collision be v_A and v_B (m s^{-1}) towards C.			
			$2\times5=2v_A+4v_B$	M1	3.3	COLM. *Allow one error (e.g. sign)*
			$v_B-v_A=\frac{4}{5}\cdot5$	M1	3.3	NEL; *Allow one error, but not coefficient placed on wrong side.*
			$v_A=-1, v_B=3$	A1	1.1	
			KE before $=\frac{1}{2}\cdot2\cdot5^2$ $(=25\text{J})$	M1	1.1	Attempt at KEs, before and at least one sphere after (numerical)
			KE after $=\frac{1}{2}\cdot2\cdot(-1)^2+\frac{1}{2}\cdot4\cdot(3)^2$ $(=19\text{J})$			
			Percentage energy loss $=\frac{25-19}{25}\times100=24\%$	A1 [5]	2.2a	**AG** Fully correct working
	(c)		Let the velocities of B and C after the second collision be w_B and w_C (m s^{-1}) in direction AC.			*Note $w_B=$ their v_A may be used from the start*
			$4w_B+(1)w_C=4(3)+1(-u)$	M1	3.3	COLM; *Allow one error*
			$w_C-w_B=\frac{2}{3}(3+u)$	M1	3.3	NEL; *Allow one error (e.g. $v_B=12$ used), but not coefficient placed on wrong side.*
				A1 FT	1.1	Both equations correct (signs must be consistent) FT from their v_B
			$4w_B+\frac{2}{3}(3+u)+w_B=12-u$ $w_B=2-\frac{1}{3}u$	M1	3.4	Eliminating w_C to obtain an equation involving w_B and u (or equation for u if $w_B=-1$ has been substituted)
			For third collision to occur, we require $w_B<v_A$ $2-\frac{1}{3}u<-1$	M1	2.2a	Comparing **their** w_B with **their** v_A *Allow* = *Signs must be correct, e.g M0 for their $w_B<1$* *Ignore any further comparisons* This M1 can be awarded earlier, for **s**ubstituting $w_B=$ their v_A into both equations
			$u>9$	A1 [6]	1.1	Must be strict inequality. Allow statement in words.

Question			Answer	Marks	AOs	Guidance
4 cont	**(d)**		e.g. the model does not account for any possible air resistance	**B1** **[1]**	**3.5a**	Or any other correct limitation, e.g. In reality the surface would not be smooth Motion would not be in a perfect straight line

Question			Answer	Marks	AOs	Guidance
5	**(a)**			**B1**	**1.1**	Any two of $\frac{1}{2}m(6^2)$, $\frac{1}{2}m(12^2)$, $mg(6.5)$
			$\frac{1}{2}m\times6^2+mg\times6.5-42=\frac{1}{2}m\times12^2$	**M1**	**3.3**	Attempt at WEP on stage BC; *Allow sign errors and one missing term (but must contain 42)*
			$18m+63.7m-42=72m$ $9.7m=42$, so $m=4.33$	**A1** **[3]**	**1.1**	**AG** Fully correct working. *At least one step required between WEP equation and the given answer* *Allow verification*
	(b)			**B1**	**1.1**	Work done by F is $(50\cos\theta)(5)$
				B1	**1.1**	Change in PE is $mg(5\sin30°)$
			$\frac{1}{2}m(3^2)+(50\cos\theta)(5)-58=\frac{1}{2}m(6^2)+mg(5\sin30°)$ $19.5+250\cos\theta-58=77.9+106.1$ $\cos\theta=\frac{38m+58}{250}=\frac{222.5}{250}=0.8901\ldots$	**M1**	**3.3**	Attempt at WEP on stage AB; *Allow sign errors and one missing term (but must contain WD by F term)*
			$\theta=27.1°$	**A1** **[4]**	**1.1**	
			Assuming constant resistance and acceleration **(Max 3/4)** Resistance is $\frac{58}{5}$ $(=11.6)$, Acceleration is $\frac{6^2-3^2}{2\times5}$ $(=2.7)$	**B1**		For both
			$50\cos\theta-11.6-4.33\times9.8\sin30°=4.33\times2.7$	**M1**		N2L *Allow sign errors and one missing term*
			$\theta=27.1°$	**A1**		
	(c)		$50\cos\theta\times6$	**M1**	**3.4**	Use of $P=Dv$ where $D=50\cos\theta$ or $D=50\sin\theta$ with their value of θ from part **(b)**, and $v=6$
			$=267$ (W)	**A1 FT** **[2]**	**1.1**	FT is $300\cos$ (their θ)

Question			Answer	Marks	AOs	Guidance
6	(a)		$\text{Area} = \left(12q + \frac{1}{2}pq\right)$	**B1**	**1.1**	soi *Award if correct ratios* 24 : p : (24+p) *oe used*
			$\left(12q + \frac{1}{2}pq\right)\begin{pmatrix}\bar{x}\\ \bar{y}\end{pmatrix} = 12q\begin{pmatrix}6\\ \frac{1}{2}q\end{pmatrix} + \frac{1}{2}pq\begin{pmatrix}12+\frac{1}{3}p\\ \frac{2}{3}q\end{pmatrix}$	**M1**	**3.3**	Equation for one component *Allow one error* *Count $\bar{x}$ and $\bar{y}$ interchanged as one error*
				A1	**1.1**	Equation for one component correct *FT their area* *Condone missing brackets if the intention is clear* *This M1A1 can be awarded for a frame (see below)*
			$\Rightarrow \bar{x} = \frac{72 + 6p + \frac{1}{6}p^2}{12 + \frac{1}{2}p}\left(= \frac{432 + 36p + p^2}{72 + 3p}\right)$			
			$\Rightarrow \bar{y} = \frac{6q + \frac{1}{3}pq}{12 + \frac{1}{2}p}\left(= \frac{36q + 2pq}{72 + 3p}\right)$	**A1**	**1.1**	cao Both components (any correct form)
				[4]		
			SC Considered as a uniform frame (**Max 2/4**) $(24 + p + q + \sqrt{p^2 + q^2})\begin{pmatrix}\bar{x}\\ \bar{y}\end{pmatrix} = (12)\begin{pmatrix}6\\ 0\end{pmatrix} + \sqrt{p^2 + q^2}\begin{pmatrix}12 + \frac{1}{2}p\\ \frac{1}{2}q\end{pmatrix} + (12 + p)\begin{pmatrix}6 + \frac{1}{2}p\\ q\end{pmatrix} + q\begin{pmatrix}0\\ \frac{1}{2}q\end{pmatrix}$			**M1** Equation for one component *Allow one error* **A1** Equation for one component correct
	(b)		$\bar{x} = 7.6$	**B1**	**3.1b**	Stated or implied, e.g. by equating **their** expression for $\bar{x}$ in part **(a)** to 7.6. Ignore incorrect value of $\bar{y}$, e.g. '(7.6, q) is the CM' earns B1
			$\Rightarrow 432 + 36p + p^2 = 7.6(72 + 3p)$ $\Rightarrow p^2 + 13.2p - 115.2 = 0$	**M1**	**1.1**	Equating **their** expression for $\bar{x}$ in part **(a)** to 7.6, and obtaining a three term quadratic equation for p *(Not necessarily …=0) Implied by $p = 6$ www*
			$\Rightarrow p = 6$	**A1**	**1.1**	**BC**
				[3]		
	(c)		$\bar{y} = \frac{6q + \frac{1}{3}\cdot 6q}{12 + \frac{1}{2}\cdot 6}$ $\left(= \frac{8}{15}q\right)$	**M1**	**3.4**	Substituting **their** p into **their** expression for $\bar{y}$ *M0 if their $\bar{y}$ does not contain p*
			$q - \bar{y} = 7.6\tan 35°$ $(= 5.32)$	**M1**	**3.1b**	soi Allow $7.6/\tan 35°$ or equivalent *If their $\bar{y} = ½q$, then $½q = 5.32$, by itself, is M0* *Allow 30° as a misread for 35°*
			$q = 11.4$	**A1**	**1.1**	Awrt 11.4 (11.403379…)
				[3]		

Need to get in touch?

If you ever have any questions about OCR qualifications or services (including administration, logistics and teaching) please feel free to get in touch with our customer support centre.

Call us on

01223 553998

Alternatively, you can email us on

support@ocr.org.uk

For more information visit

ocr.org.uk/qualifications/resource-finder

ocr.org.uk

Twitter/ocrexams

/ocrexams

/company/ocr

/ocrexams

CAMBRIDGE
UNIVERSITY PRESS & ASSESSMENT

OCR is part of Cambridge University Press & Assessment, a department of the University of Cambridge.

OCR operates academic and vocational qualifications regulated by Ofqual, Qualifications Wales and CCEA as listed in their qualifications registers including A Levels, GCSEs, Cambridge Technicals and Cambridge Nationals.

OCR provides resources to help you deliver our qualifications. These resources do not represent any particular teaching method we expect you to use. We update our resources regularly and aim to make sure content is accurate but please check the OCR website so that you have the most up-to-date version. OCR cannot be held responsible for any errors or omissions in these resources.

Though we make every effort to check our resources, there may be contradictions between published support and the specification, so it is important that you always use information in the latest specification. We indicate any specification changes within the document itself, change the version number and provide a summary of the changes. If you do notice a discrepancy between the specification and a resource, please contact us.

Whether you already offer OCR qualifications, are new to OCR or are thinking about switching, you can request more information using our Expression of Interest form.

Please get in touch if you want to discuss the accessibility of resources we offer to support you in delivering our qualifications.