

YEAR 2 | MODULE 5 | PACK 01

Period, speed and circular acceleration

Official past-paper mark scheme

2017-2023 | OCR A H556 | 5.2.1(b)-(c); 5.2.2(b)-(c)

20 marks | 6 question entries

One practice session

Match each extract using its question number and stable CM identifier. Original OCR answers, examiner guidance, alternatives, diagrams and level descriptors are preserved.

The heading gives the maximum marks for the assigned subparts. Alternative methods and "any n from" lists offer routes to those marks; do not add every printed point together.

Click a source reference to open OCR's full official mark scheme. Keep this file closed while attempting the questions.

Reserved: all 2024 and 2025 papers are excluded. These files contain official examination questions only; no sample, specimen or practice papers.

Question index

CM identifiers are stable across the question packs and mark schemes; Q numbers refer to this pack. This core pack has no selected MCQs.

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Q01 | CM09A12

3 marks

June 2018 | H556/01 | Q17(a)(i)-(ii)

Question			Answer	Marks	Guidance
17	(a)	(i)	Horizontal arrow pointing to the right.	B1	Judgement by eye
		(ii)	$2.14 \times 10^3 = \frac{2 \times \pi \times 9380 \times 10^3}{T}$ (Any subject) $T = 2.75 \times 10^4$ (s)	C1 A1	Allow 2SF answer Note: 2.75... x 10 ⁿ scores 1 mark.

Q02 | CM17

2 marks

November 2020 | H556/03 | Q4(b)(ii)

Question			Answer	Marks	Guidance
		(ii)	$2\pi r/T = v$ or $T = 2 \times 3.14 \times 6.78 \times 10^6 / 7.7 \times 10^3$ $T = 5.5 \times 10^3 \text{ s (= 92 min)}$	M1 A1	ECF incorrect value of R from b(i)

Q03 | CM10B

3 marks

June 2018 | H556/01 | Q21(b)

Question			Answer	Marks	Guidance
	(b)		$T = 60/1600$ or $T = 3.75 \times 10^{-2} \text{ (s)}$ $(v = \pi \times 0.50/3.75 \times 10^{-2})$ speed = 42 (m s ⁻¹) uncertainty = 3 (m s ⁻¹)	C1 A1 A1	Allow: $f = 26.7$ or $\frac{1600}{60}$ (Hz) or $\omega = 168 \text{ (s}^{-1}\text{)}$ Note: v must be to 2 or more SF Note: uncertainty must be to 1 SF Allow: ecf on candidate's value for speed i.e. uncertainty = candidate's value / 16 (to 1 SF) Allow for 2 marks max: $84 \pm 5 \text{ (m s}^{-1}\text{)}$

3 marks

[illegible]

Q05 | CM20

3 marks

November 2021 | H556/03 | Q3(b)(ii)

Question			Answer	Marks	Guidance
		(ii)	$v = 2\pi r/T = 2\pi \times 1.5 \times 10^{11} / 3.16 \times 10^7 (= 29.8 \text{ km s}^{-1})$ $KE = \frac{1}{2}mv^2 = 0.5 \times 810 \times (29.8 \times 10^3)^2$ $KE = 3.6 \times 10^{11} \text{ (J)}$	C1 M1 A1	Allow proof by algebraic method for full marks e.g. $mv^2/r = GMm/r^2$ so $mv^2 = GMm/r$ Therefore $KE/GPE = \frac{1}{2}mv^2/(GMm/r) = \frac{1}{2}$

Q06 | CM11

6 marks

June 2018 | H556/02 | Q17

Question	Answer	Marks	Guidance
17*	Level 3 (5–6 marks) Clear explanation, some description and both resistance values correct <i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i> Level 2 (3–4 marks) Some explanation, limited or no description and both resistance values correct OR Clear explanation, limited or no description and calculations mostly correct / one correct calculation OR Clear explanation, some description and no calculations <i>There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence.</i> Level 1 (1–2 marks) Some explanation OR Some description OR Some calculation <i>There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant.</i> 0 marks No response or no response worthy of credit	B1 × 6	Indicative scientific points may include: Explanation of trace - The ‘trace’ is because of light reaching and not reaching LDR - Resistance of LDR varies with (intensity) of light - In light - resistance of LDR is low - p.d. across LDR is low - p.d across resistor (or V) is high - current in circuit is large - In darkness - resistance of LDR is high - p.d. across LDR is high - p.d across resistor (or V) is low - current in circuit is small $V_{\max} = 4.0 \text{ V}$; $V_{\min} = 2.0 \text{ V}$ - Potential divider equation quoted - Substitution into potential divider equation Description of determining frequency - Time between pulses is constant because of constant speed - Time between pulses = 0.4 (s) $f = 1/T$ - frequency = 2.5 (Hz) Calculations - Resistance of LDR is 150 (Ω) in light - Resistance of LDR is 1500 (Ω) in darkness