

Name of the Student: _____

Max. Marks : 18 Marks

Time : 18 Minutes

Mark Schemes

Q1.

Question	Answer	Additional guidance	Mark
(i)	percentage transmitted (1) $100 - 67 - 15$ $18 (\%)$ evaluation (1) $0.25 \times \frac{18}{100}$ 0.045 (J)	0.1675 or 0.0375 or $0.25 - 0.1675 -$ 0.0375 or $0.25 - 0.205$ allow 82% calculated as 0.205 (J) for 1 mark 0.045 to any other power of ten scores 1 mark award full marks for the correct answer without working	2 AO2.1

Question	Answer	Additional guidance	Mark
(ii)	one from increase the thickness (of it/ the absorber /the insulating board) (1) make the surface (of board) more reflective / make the board more absorbing (1) make board less/more dense (1) put an airgap in the insulating board (1) add another material with different density adjacent to board (1)	do not accept 'add more insulation' on its own ignore mass, surface area, volume, amount and size allow change the density (of the board)	1 AO3.1

Q2.

Question	Answer	Additional guidance	Mark
(i)	percentage transmitted (1) $100 - 67 - 15$ $18 (\%)$ evaluation (1) $0.25 \times \frac{18}{100}$ 0.045 (J)	0.1675 or 0.0375 or $0.25 - 0.1675 -$ 0.0375 or $0.25 - 0.205$ allow 82% calculated as 0.205 (J) for 1 mark 0.045 to any other power of ten scores 1 mark award full marks for the correct answer without working	2 AO2.1

Question	Answer	Additional guidance	Mark
(ii)	one from increase the thickness (of it/ the absorber /the insulating board) (1) make the surface (of board) more reflective / make the board more absorbing (1) make board less/more dense (1) put an airgap in the insulating board (1) add another material with different density adjacent to board (1)	do not accept 'add more insulation' on its own ignore mass, surface area, volume, amount and size allow change the density (of the board)	1 AO3.1

Q3.

	Answer	Additional guidance	Mark
(i)	calculation of time of travel (1) $(120/330 =) 0.36(36)$ (s) substitution (1) $\frac{0.23 \times 100}{0.36(36)}$ evaluation (1) 63 (%)	ecf from MP1 for MP2&3 accept values that round to 64 or 63 accept values that round to 0.64 or 0.63 for 2 marks award full marks for the correct answer without working	(3) AO2
	Answer		Mark
(ii)	C Increase the distance between L and M. A, B and D are incorrect as these would not improve the technicians' measurement		(1) AO3

Q4.

Question number	Answer	Additional guidance	Mark
	recall and substitution (1) $D = \frac{1}{2} v \times t = \frac{1}{2} 1500 \times 0.048$ evaluation (1) 36 (m)	 award full marks for the correct answer without working award 1 mark only for 72 m (i.e. $\frac{1}{2}$ ignored)	(2) grad

Q5.

	Answer	Additional guidance	Mark
	Two possible methods: selection (1) distance = speed x time substitution (1) (total distance =) $330 \times 18 (\times 10^{-3})$ evaluation of total distance (1) 5.9(4) (m) evaluation of distance from bat to prey (1) 3.0 (m)	speed = distance / time $330 = d / 18(\times 10^{-3})$ $330 \times 18(\times 10^{-3})$ scores mp1 and mp2 allow their distance divided by 2 for MP4 allow 2.97 (m) 5.94 scores 3 marks 5.94 to any other power of 10 scores 2 marks 2.97 or 3 to any other power of 10 scores 3 marks	(4) AO2

	OR selection (1) distance = speed x time division of time by 2 (1) 9×10^{-3} substitution (1) (total distance =) $330 \times 9 \times 10^{-3}$ evaluation of distance from bat to prey (1) 3.0 (m)	speed = distance / time $330 = d / 9 \times 10^{-3}$ $330 \times 9 \times 10^{-3}$ scores mp1 and mp2 and mp3 allow 2.97 (m) 2.97 or 3 to any other power of 10 scores 3 marks award full marks for the correct answer without working	
--	---	--	--

Q6.

	Answer	Additional guidance	Mark
	substitution and rearrangement (1) $(f =) \frac{330}{11(\times 10^{-3})}$ evaluation (1) 30 000 (Hz)	award full marks for the correct answer without working 30 or 300 or 3000 scores 1 mark	(2) AO2