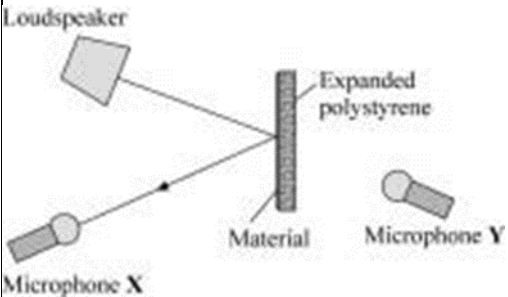


SOUND WAVES MARK SCHEMES

Question 1			
Question	Answers	extra information	mark
(a)	(mechanical) vibration(s)	not just particles knocking into each other not reference to sound particles	1
(b)	K		1
(c)(i)	reflected by the material from loudspeaker to microphone X shown by straight lines with angle of incidence = angle of reflection (by eye) and at least one arrow in the correct direction	do not credit if the direction is contradicted by any incorrect arrow may be shown by waves / wave fronts in the direction of straight lines ignore any sound to Y or which misses the material example 	
(ii)	any one from: <ul style="list-style-type: none">so (the student) can compare results	do not credit just so it's a fair test	1

	<ul style="list-style-type: none"> so only one (independent) variable to get reliable / accurate results because (the expanded) polystyrene absorbs some of the sound 		
(iii)	[A] wood		1
	[B] either 0.25 or 1/4 or 25 % or 15/60 or 1: 3	do not credit 1 : 4	1
(d)	practical suggestion appropriate reason / explanation	<p>example line / panel the walls with wood / plasterboard / increase the thickness of the plaster (on the walls) (1) (this) will absorb / reflect (back) (most / some of) the sound (1)</p> <p>credit legal suggestions for attempting to limit the noise made by the neighbors example ask the neighbors to make less noise (1) by limiting the time(s) music played (1)</p> <p>do not credit reference to sound particles for second mark</p>	1 1
total			9
Question 2			
a)	C (only)		1
b)	A (only)		1
Total			2
Question 3			

(a)(i)	bat(s)		1
(a)(ii)	elephant(s)		1
(a)(iii)	any example in the inclusive range 5 ↔ 29 Hz / hertz	appropriate number and unit both required	1
(b)(i)	B		1
(b)(ii)	F		1
Total			5
Question 4			
(a)(i)	A, C and D	any order but all three required and no others	1
(a)(ii)	D and E	either order but both required and no others	1
(b)(i)	20000 (Hz) to 20 (Hz) or vice-versa	accept 19980 (Hz)	1
(b)(ii)	frequency (of dog whistle) too high (for humans to hear) / frequency above 20000 Hz	accept it is ultrasound accept sound from the whistle is ultrasonic	1
Total			4