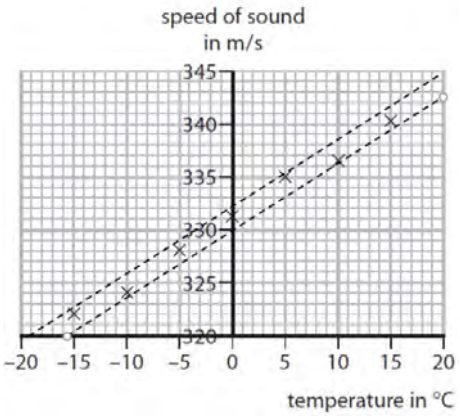
Question number	Answer	Notes	Marks
5 (a)	MP1. measure time for a set distance; MP2. realistic values suggested for experiment to work; MP3. suitable measuring instrument named; MP4. further detail of setup; MP5. idea of repeats and average; MP6. reference to speed = distance / time;	allow measuring wavelength for a known frequency e.g. • greater than 1m for microphones and oscilloscope method • greater than 100m for seeing and hearing a clap method • greater than 50m for wall and echo method • wavelength measured greater than 10cm e.g. stop clock, stopwatch, ruler, tape measure, oscilloscope e.g. • two microphones on bench connected to oscilloscope • start timing when see a clap and stop when hear it • clap by wall and time how long for clap to come back • moving a microphone until waveforms line up on oscilloscope allow speed = frequency × wavelength	6

(b)	(i)	straight line of best fit drawn within indicated area;  	line does not need to be extended beyond data range for this mark	1
	(ii)	line of best fit extended as a straight line to 20°C; student's own value from graph ± half a square;	condone straight line extension of dot to dot line allow range of 342-345 (m/s) allow ecf from line drawn in (i)	2
	(iii)	speed (of sound) decreases (with temperature); so wavelength decreases (with temperature);	allow 'sound slows down' ignore references to particle speed allow λ is smaller	2

Total for question 5 = 11 marks