1	**(a**	source of sound (e.g. gun/hooter), tape (100 m), stopwatch NOT clock, metre rule (unless lab method)	B1	[1]
	(b)	distance <u>and</u> time between "flash and bang" (must be clear)	B1	[1]
	(c)	distance/time OR d/t OR 2d/t	B1	[1]
	(d)	further apart/more accurate timer/repeat/any other	B1	[1]
	(e)	speed of sound in air, tick 100	B1	
		speed of sound in water, tick 1000	B1	[2]
				[Total: 6]

2	**(a (i)**	diagram showing compressions and rarefactions (could be either spaced vertical lines or dots, or coil or sine wave) 2C's and 2R's in approx correct place	B1 B1	
	(ii)	wavelength correctly marked, by eye	B1	
	(b) (i)	all 3 in correct positions	B1	
	(ii)	radio (waves)	B1	
	(iii)	3×10^8 m/s	B1	
				[Total: 6]

3	**(a**	Longitudinal or pressure waves	B1	**1**
	(b)	a correct C marked a correct R marked	B1 B1	**2**
	(c)	oscillation/vibration/backwards and forwards along PY (consider pressure waves as alternative)	M1 A1	**2**
	(d)	wavelength = 340/200 PX(= λ/2) = 0.85 m	C1 A1	**2** **[7]**

4	**(a)**	Sound reflects off wall	**B1**	**[1]**
	(b)	400 Hz	**B1**	**[1]**
	(c)	λ = v/f or = 330/400 = 0.83 m	**C1** **A1**	**[2]**
	(d)	vibration/oscillation along line of/direction of wave	**B1**	**[1]** **Total [5]**

5	**(a**		C,R,C,R,C,R marked (or v.v.) along XY	**B1**	**1**
	(b)	**(i)**	Above normal / high air pressure or particles close together	**B1**	
		(ii)	Below normal / low pressure or particles further apart	**B1**	**2**
	(c)		Oscillation / vibration of particles / molecules (or particles / molecules move to and fro) Oscillation is along XY	**B1** **B1**	**2**
	(d)		Time = distance / speed or (2x) 50/340 Time = 0.29 s	**C1** **A1**	**2**

6	**(a)**	diffraction	**1**	**1**
	(b)	plane waves in front of gap	**1**	
		curved end effect shown, reasonable curves	**1**	
		wavelength constant throughout and approximately same as in Fig. 8.1	**1**	
		good quality i.e. end effect starts at correct points	**1**	**4**
	(c)	particles/water oscillate/vibrate/move up and down	**1**	
		at right angles to wave direction	**1**	**2**
				(7)

7	a(i)	C marked vertically under/at any peak (including on axis)	B1	
		R marked on NEXT trough (either way)	1 B1	
	(ii)	half a wavelength	1 B1	3
	b	f = v/w or 340/1.3	C1	
		= 260 Hz*	2 A1	2
			QT	5