Question number	Answer	Notes	Marks
8 (a) (i)	buzzer B travels **twice** the distance; in the same time (period) OR (average) speed = distance/time taken;	ignore quoting distances since given in question	2
(ii)	any three from: MP1. frequency decreases; MP2. due to Doppler effect; MP3. idea of increased wavelength; MP4. idea that **decrease** in frequency of buzzer B is twice that of buzzer A;	 allow for either / both buzzer(s) reject if one frequency said to be increased allow idea of waves behind buzzers being more spread out reject if one wavelength said to be decreased allow frequency of buzzer B being lower than frequency of buzzer A / ORA	3
(b)	determination of number of squares for one period; correct use of oscilloscope settings; evaluation in standard form; e.g. period = 4 squares (period = 4) × 0.002 (period =) 8×10^{-3} (s)	 seen anywhere in working award 2 marks for answers of 4×10^{-3}, 16×10^{-3} (s)	3
(c) (i)	10 (nm);		1
(ii)	idea the speed of Q is double the speed of P;	allow greater speed	1
(iii)	20 (nm);	allow ecf from (c)(i)	1
(iv)	any four from: MP1. further / faster galaxy (Q) shows greater red shift; MP2. further galaxy (Q) is travelling faster; MP3. (which suggests) universe is expanding; MP4. idea that at an earlier point in time; MP5. the universe was a single point;	 allow use of phrases such as “originated” / eq.	4

Total for Question 8 = 15 marks