Question number	Answer	Notes	Marks
4 (a) (i)	measure the distance between microphones; suitable instrument to measure distance; use of speed = distance ÷ time;	 e.g. ruler / tape measure	3
(ii)	idea that time will be very small / too hard to measure by a human;	allow idea that human reaction time is an issue ignore speed of sound is very fast / eq.	1
(b) (i)	idea that air needs to be same temperature at all points between microphones;	allow idea that speed will change if temperature not constant ignore 'fair test'	1
(ii)	correctly calculate average; given to 1 decimal place; e.g. 59.97 = 1 mark 60.0 = 2 marks	 DOP 59.9 scores 1 mark allow 59.96, 60	2
(iii)	point at (40, 358) circled;		1
(iv)	repeat it / discard it;	allow repeat experiment condone 'ignore it'	1
(v)	line graph suitable for continuous data; **both** variables are continuous;	allow 'data is continuous'	2
(vi)	idea that speed increases as temperature increases; idea of a linear relationship;	ignore positive correlation reject mark if relationship described as directly proportional	2

Total for Question 4 = 13 marks

Question number	Answer	Notes	Marks
8 (a)	Universe began as hot / dense point; Universe has expanded since the Big Bang; Universe has cooled since the Big Bang;	allow idea that Universe started as a single point	3
(b)	any four from: MP1. presence of cosmic microwave background radiation; MP2. CMBR comes from all directions; MP3. CMBR (began as gamma radiation and) wavelength increased (as Universe expanded); MP4. red-shift of galaxies; MP5. further/faster galaxies show a greater red-shift; MP6. red-shift indicates that galaxies are moving away from each other; MP7. relative abundance of helium; MP8. helium formed when Universe was hot enough to fuse protons;	 allow CMBR allow CMBR is uniform allow large amount of helium	4

Total for Question 8 = 7 marks