

Question number	Answer	Notes	Marks
6 (a)	any two from: MP1. CMBR appears to be the same in all directions / is everywhere; MP2. (which) implies all parts of the Universe were in contact a long time ago; MP3. wavelength has increased (as the universe has expanded); MP4. Universe was (significantly) hotter long ago;	allow implication of idea of coming from single point allow red-shift of radiation allow frequency has decreased allow RA	2
(b)	change in wavelength = 78 (nm); substitution; rearrangement; evaluation;  e.g. $(683 - 605 =) 78 \text{ (nm)}$ $78 / 605 = v / c$ $v = 3.0 \times 10^8 \times (78/605)$ $(v =) 3.9 \times 10^7 \text{ (m/s)}$	ignore units  -1 for POT error use of incorrect source wavelength gives $3.4 \times 10^7 \text{ (m/s)} = 3$ marks  allow $3.86... \times 10^7 \text{ (m/s)}$	4

(Total for Question 6 = 6 marks)