Question Number	Answer		Mark
17(a)	In the fusion process mass decreases	**(1)**	
	So energy is released according to $\Delta E = c^2 \Delta m$ **Or** energy is released to conserve mass-energy **Or** binding energy per nucleon increases	**(1)**	**2**
17(b)	**Max 4**		
	Very high temperature so that the nuclei have sufficient kinetic energy	**(1)**	
	Nuclei must overcome electrostatic repulsion/forces [Allow a reference to overcome repulsion/forces due to positively charged nuclei]	**(1)**	
	So that the nuclei come close enough to fuse	**(1)**	**4**
	Sufficient density so that the collision rate (between nuclei) is high (enough)	**(1)**	
	Sufficient collision rate to maintain the (very high) temperature	**(1)**	
17(c)	Values of B.E./nucleon read from graph [min 2 values]	**(1)**	
	Calculation of binding energies	**(1)**	
	Energy released = 17.4 (MeV) [Allow 17.3 MeV – 17.5 MeV]	**(1)**	**3**
	<u>Example of calculation</u> B.E./nucleon of ^{2}H = 1.1 MeV B.E./nucleon of ^{3}H = 2.8 MeV B.E./nucleon of 4He = 7.0 MeV So energy released = 4 × 7.0 MeV – (2 × 1.1 MeV + 3 × 2.8 MeV) = 17.4 MeV		
	Total for question 17		**9**