

9(a)	difference between mass of nucleus and mass of (constituent) nucleons
	when nucleons are separated to infinity
9(b)	$\Delta m = (2 \times 2.013553) - (4.001505) \text{ (u)}$ $(= 0.025601 \text{ u})$
	$E = c^2 \Delta m$
	energy from one He-4 nucleus = $0.025601 \times 1.66 \times 10^{-27} \times (3.00 \times 10^8)^2$ $(= 3.82 \times 10^{-12} \text{ J})$
	energy to form 1.00 mol = $3.82 \times 10^{-12} \times 6.02 \times 10^{23}$ $= 2.30 \times 10^{12} \text{ J}$
9(c)(i)	$L = 1.09 \times 10^{11} \times (3.00 \times 10^8)^2$
	$= 9.81 \times 10^{27} \text{ W}$
9(c)(ii)	$L = 4\pi\sigma r^2 T^4$
	$9.81 \times 10^{27} = 4\pi \times 5.67 \times 10^{-8} \times (1.19 \times 10^9)^2 \times T^4$
	$T = 9930 \text{ K}$
9(d)	standard candles have known luminosity
	radiant flux intensity (from star) measured (on the Earth)
	distance found from $F = L / (4\pi d^2)$