

8(a)	<i>Any three points from:</i> • electrons moving between levels emit a single photon • energy of photon = difference between energy levels • energy of photon depends on frequency • discrete frequencies (in spectrum) so differences between electron energies must be discrete • discrete differences between electron energies means energy levels must be discrete
8(b)(i)	energy = $-(13.6 \times 1.60 \times 10^{-19})$ $= -2.18 \times 10^{-18} \text{ J}$
8(b)(ii)	$\Delta E = hf$
	$= (6.63 \times 10^{-34} \times 2.47 \times 10^{15}) / (1.60 \times 10^{-19}) = 10.2 \text{ eV}$
8(b)(iii)	$n = 2$ energy level = -3.4 eV
	$n = 3$ energy difference = 12.1 eV
	$n = 4$ energy difference = 12.8 eV
	$n = 3$ energy level = -1.5 eV and $n = 4$ energy level = -0.8 eV