

Phys 201 F'09 Problem Set 10 Solutions

$$8.13 \quad E_{n_x, n_y, n_z} = \frac{\hbar^2 \pi^2}{2m a^2} (n_x^2 + n_y^2 + n_z^2), \quad n_x, n_y, n_z \geq 1$$

There is a bit of trial and error involved in selecting n_x, n_y, n_z in order of increasing E_{n_x, n_y, n_z} .

The smallest 8 values of E_{n_x, n_y, n_z} are:

$(n_x, n_y, n_z) = (1, 1, 1)$	$\rightarrow E = \frac{\hbar^2 \pi^2}{2m a^2} \cdot 3$	degeneracy = 1
$(1, 2, 1), (2, 1, 1), (1, 1, 2)$	$\rightarrow E = \frac{\hbar^2 \pi^2}{2m a^2} \cdot 6$	3
$(1, 2, 2), (2, 1, 2), (2, 2, 1)$	$\rightarrow E = " \cdot 9$	3
$(1, 1, 3), (1, 3, 1), (3, 1, 1)$	$\rightarrow E = " \cdot 11$	3
$(2, 2, 2)$	$\rightarrow E = " \cdot 12$	1
$(1, 2, 3), (1, 3, 2), (2, 1, 3),$ $(2, 3, 1), (3, 1, 2), (3, 2, 1)$	$\rightarrow E = " \cdot 14$	6
$(2, 2, 3), (2, 3, 2), (3, 2, 2)$	$\rightarrow E = " \cdot 17$	3
$(1, 1, 4), (1, 4, 1), (4, 1, 1)$	$\rightarrow E = " \cdot 18$	3