

CH301H – Principles of Chemistry I: Honors  
Fall 2013, Unique 52195

Quiz 4, October 24, 2013

One of the solutions for an orbital defined by  $n = 2$  and  $l = 1$  is:

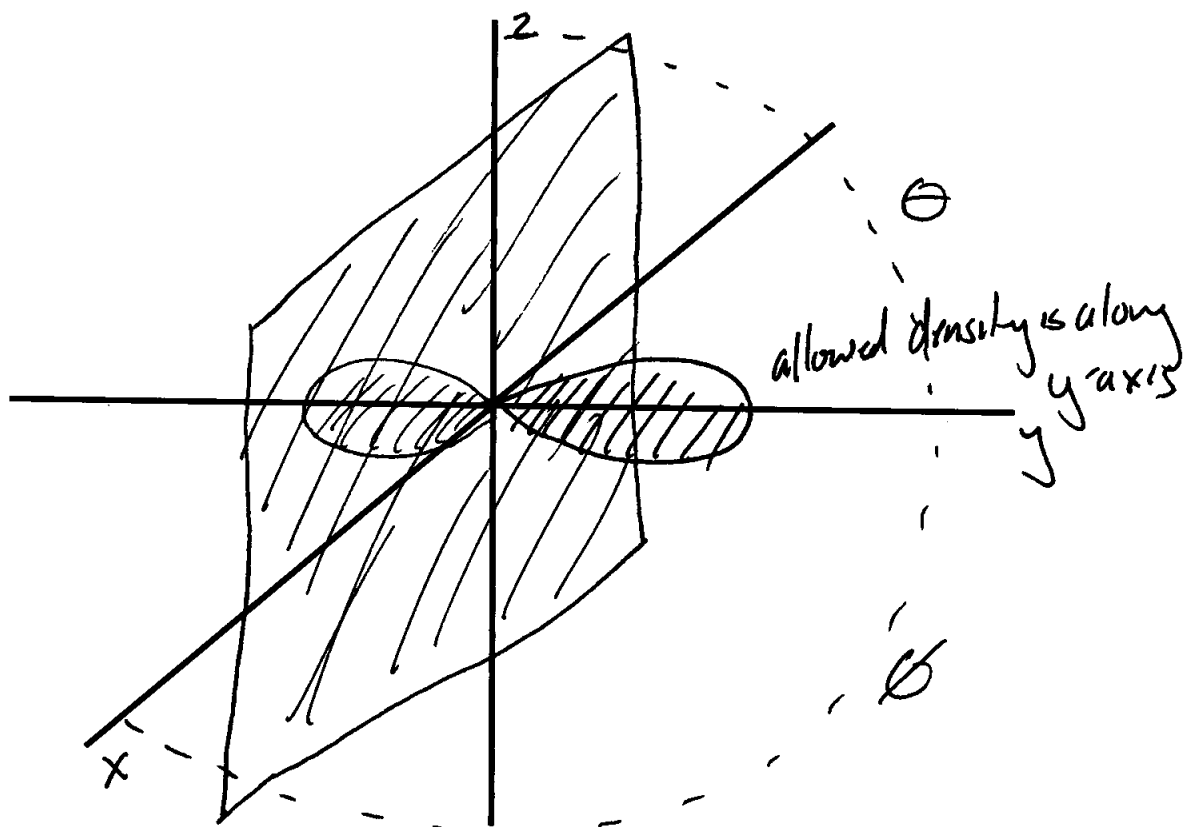
$$Y(\theta, \phi) = \left(\frac{3}{4\pi}\right)^{\frac{1}{2}} \sin\theta \sin\phi$$

$= 0$  when  $\sin\theta = 0$ ,  $\theta = 0, 180^\circ$   
when  $\sin\phi = 0$ ,  $\phi = 0, 180^\circ$   
 $\Rightarrow$  along z axis  
 $\Rightarrow$  along x axis

a) Draw this function on the set of axes given, clearly labeling your axes and the angular node.

b) What is the name of the orbital defined by this function?

angular node is z-x plane



$\Rightarrow$  this is the  $2p_y$  orbital  
from  $n$   $\rightarrow$   $2p_y$   $\leftarrow$  from  $l$   
from  $n$   $\rightarrow$   $2p_y$   $\leftarrow$  from  $\sin\theta \sin\phi = 0$