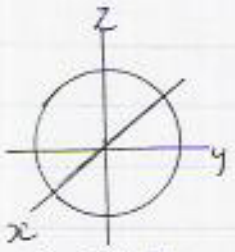
ANGULAR FUNCTIONS

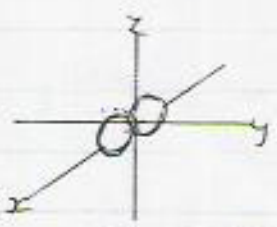
l	m_e	Angular function
0	0	$Y_{0,0} = \sqrt{\frac{1}{(4\pi)}}$
1	0	$Y_{1,0} = \sqrt{\frac{3}{4\pi}}\cos\theta$
1	1	$Y_{1,1} = -\sqrt{\frac{3}{8\pi}}\sin\theta\, e^{i\phi}$
1	−1	$Y_{1,-1} = \sqrt{\frac{3}{8\pi}}\sin\theta\, e^{-i\phi}$
2	0	$Y_{2,0} = \frac{1}{2}\sqrt{\frac{5}{4\pi}}(3\cos^2\theta - 1)$
2	1	$Y_{2,1} = -\sqrt{\frac{15}{8\pi}}\sin\theta\cos\theta\, e^{i\phi}$
2	−1	$Y_{2,-1} = \sqrt{\frac{15}{8\pi}}\sin\theta\cos\theta\, e^{-i\phi}$
2	2	$Y_{2,2} = \frac{1}{4}\sqrt{\frac{15}{2\pi}}\sin^2\theta\, e^{2i\phi}$
2	−2	$Y_{2,-2} = \frac{1}{4}\sqrt{\frac{15}{2\pi}}\sin^2\theta\, e^{-2i\phi}$

From these we can obtain expressions for orbital shapes

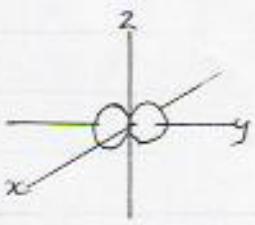
l	$\lvert m_e \rvert$	Angular function
0	0	$S = \sqrt{\frac{1}{4\pi}}$
1	0	$P_z = \sqrt{\frac{3}{4\pi}}\cos\theta$
1	1	$P_x = \sqrt{\frac{3}{4\pi}}\sin\theta\cos\phi$
1	1	$P_y = \sqrt{\frac{3}{4\pi}}\sin\theta\sin\phi$
2	0	$d_{3z^2-r^2} = \sqrt{\frac{5}{16\pi}}(3\cos^2\theta - 1)$
2	1	$d_{xz} = \sqrt{\frac{15}{4\pi}}\sin\theta\cos\theta\cos\phi$
2	1	$d_{yz} = \sqrt{\frac{15}{4\pi}}\sin\theta\cos\theta\sin\phi$
2	2	$d_{x^2-y^2} = \sqrt{\frac{15}{4\pi}}\sin^2\theta\cos 2\phi$
2	2	$d_{xy} = \sqrt{\frac{15}{4\pi}}\sin^2\theta\sin 2\phi$



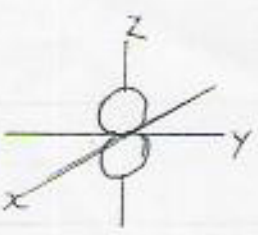
S ORBITAL



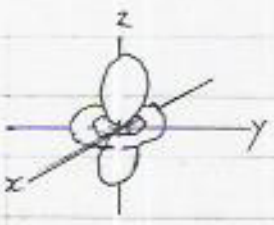
P_x ORBITAL



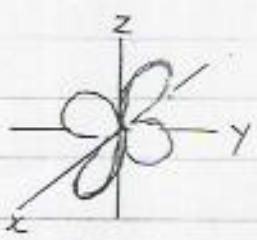
P_y ORBITAL



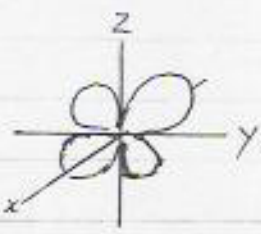
P_z ORBITAL



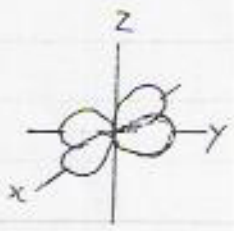
$d_{3z^2-r^2}$



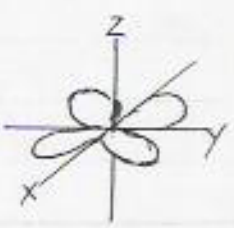
d_{xz}



d_{yz}



$d_{x^2-y^2}$



d_{xy}