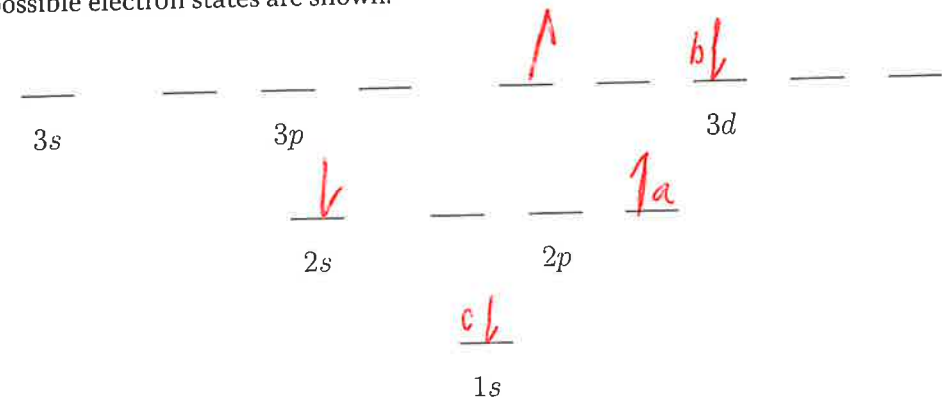
Quiz 6.2 – Orbitals and Quantum Numbers

Name: Key

Below is the hydrogenic atom energy level diagram (which only applies for atoms with 1 electron). Two different possible electron states are shown.



Question 1

Give the four quantum numbers for each of the two electrons shown on the diagram above

$n=3$, $l=2$, $m_l=-2$, $m_s=+1/2$

$n=2$, $l=0$, $m_l=0$, $m_s=-1/2$

Question 2

On the diagram above, draw electrons with the following quantum numbers:

- $n = 2,\ l = 1,\ m_l = 1,\ m_s = \frac{1}{2}$ a
- $n = 3,\ l = 2,\ m_l = 0,\ m_s = -\frac{1}{2}$ b
- $n = 1,\ l = 0,\ m_l = 0,\ m_s = -\frac{1}{2}$ c

Question 3

Sketch one of each of the first three orbital types (s, p, and d)

s: ○ p: ∞ d: ✿

Question 4

How many electrons can occupy the $3d$ subshell

10

Question 5

Which of the following subshells does *not* exist (which breaks the rules about orbitals)?

$2s$ $3s$ $4f$ $1p$ $4p$ $3d$