Quiz 8.1 – Orbitals

Name: Key

Question 1 (2 points)

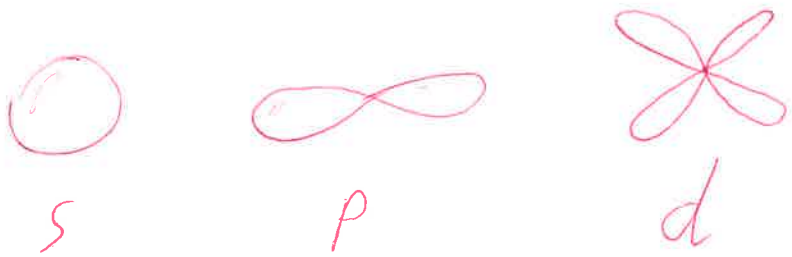
Give the energy and wavelength of light emitted by the 2 ← 4 transition in a H-spectrum

$$\Delta E = 2.179 \cdot 10^{-18} \left(\frac{1}{2^2} - \frac{1}{4^2}\right) = 4.086 \cdot 10^{-19}\ J$$

$$E = \frac{hc}{\lambda} \rightarrow \lambda = \frac{hc}{E} = \frac{6.626 \cdot 10^{-34}\ J\cdot s \cdot 2.998 \cdot 10^{8}\ m/s}{4.086 \cdot 10^{-19}\ J} = 4.862 \cdot 10^{-7}\ m = 486.2\ nm$$

Question 2 (1 point)

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



s p d

Question 3 (1 point)

How many electrons can occupy the 3d subshell

2 · 5 = 10 e's

Question 4 (1 point)

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

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

only "s" in 1st shell