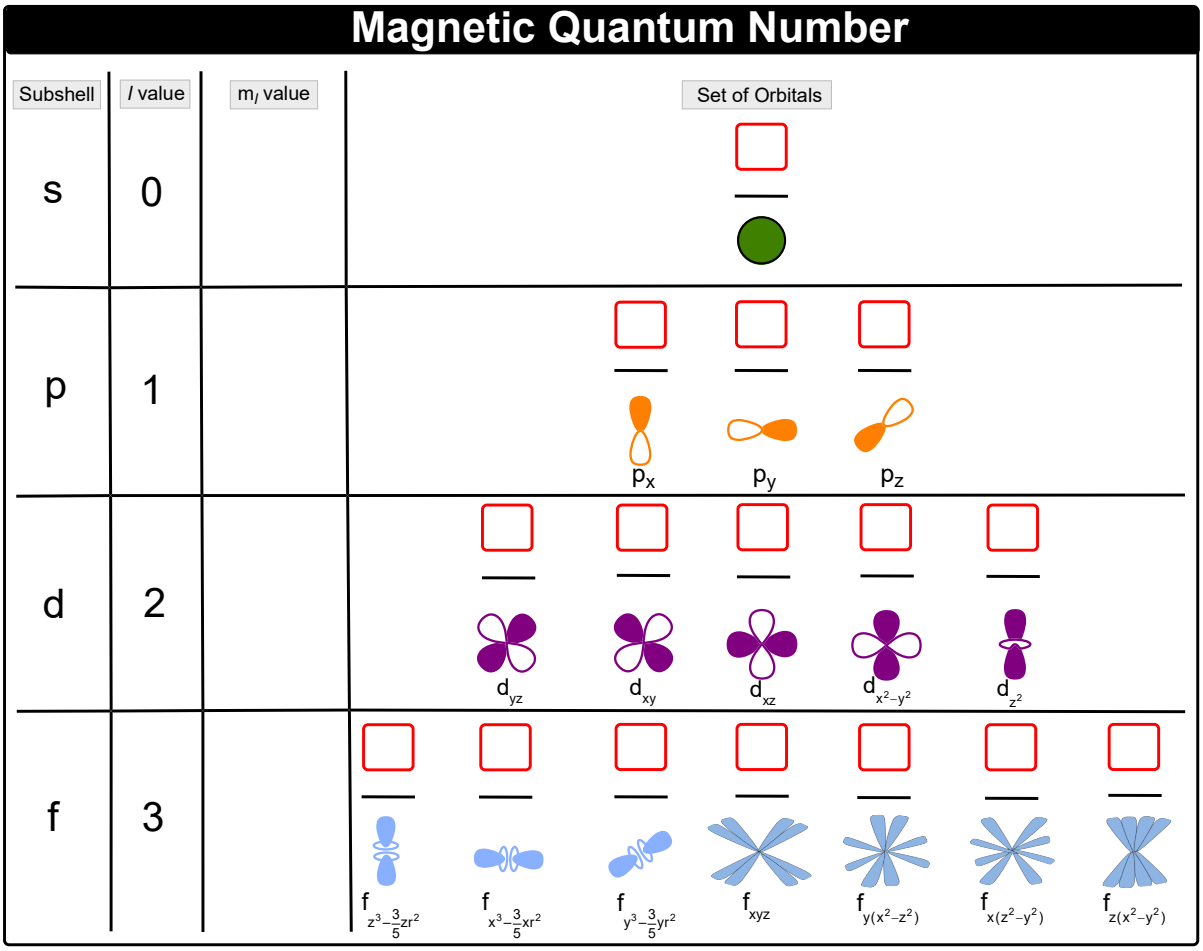
CONCEPT: QUANTUM NUMBERS: MAGNETIC QUANTUM NUMBER

- Recall, an **orbital** is the region within a subshell where *two specific electrons* can be found.
  - □ **Orbital** = _____ (_____)

EXAMPLE: Provide the identity of a set of orbitals that exist in the 4th principal level and f sublevel

a) 3f b) 4d c) 4f d) 3d e) 5f

- **The Magnetic Quantum Number (m_l)** = _____ of orbitals (**location** of electrons).
  - □ **Limitation**: It is the _____ (–*l* to +*l*) of the angular momentum quantum number *l*.



- □ Most orbitals have a letter value associated with them, but only the numerical values from m_l are important.
- □ The maximum number of electrons in s, p, d, and f subshells is _____, _____, _____, and _____.

EXAMPLE: Which of the following is not a valid magnetic quantum number for the 7f set of orbitals?

a) –1 b) –2 c) 0 d) +4 e) +3

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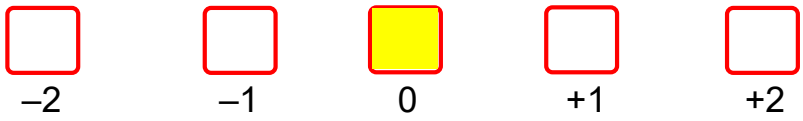
PRACTICE: How many different values of m_l are possible for a 4d set of orbitals?

a) 1 b) 3 c) 7 d) 5 e) 2

PRACTICE: Select a correct set of values for an electron found within the designated 5d orbital.



a) n = 5, l = 2, m_l = 0

b) n = 5, l = 3, m_l = +1

c) n = 5, l = 3, m_l = 0

d) n = 5, l = 5, m_l = – 2

e) n = 5, l = 2, m_l = +5

PRACTICE: Which of the following statements is false?

a) A set of *d* orbitals contains 5 orbitals.

b) A set of 4s orbitals would have more energy than a set of 3p orbitals.

c) The second shell of an atom possesses *d* orbitals.

d) A set of *f* orbitals contains 3 orbitals.

e) The first energy level contains only *s* orbitals.