Orbitals in the 4f Subshell

https://gemini.google.com/app/05e29f7a9801707b

Response: The correct option is **(4) 7**.

Step-by-Step Explanation:

1. **Identify the subshell:**
    - Principal quantum number $n = 4$
    - Azimuthal quantum number $l = 3$ corresponds to the **f-subshell** (4f).
2. **Determine the magnetic quantum number (m_l):**
    - The magnetic quantum number m_l specifies the orientation of an orbital and ranges from $-l$ to $+l$, including zero.
    - For $l = 3$:

$$m_l = -3, -2, -1, 0, +1, +2, +3$$

3. **Count the number of orbitals:**
    - The total number of orbitals in a subshell is given by the formula $2l + 1$:

$$\text{Number of orbitals} = 2(3) + 1 = 7$$

Therefore, there are **7** orbitals possible for $n = 4$ and $l = 3$.
