

Directions: Choose the letter that corresponds to the correct answer.

For questions 1 and 2, consider the following orbitals: **4f, 5d, 6s, 6p**.

1. Following Aufbau's principle, which orbital must be filled last?
 - a. 6s
 - b. 5d
 - c. 4f
 - d. 6p

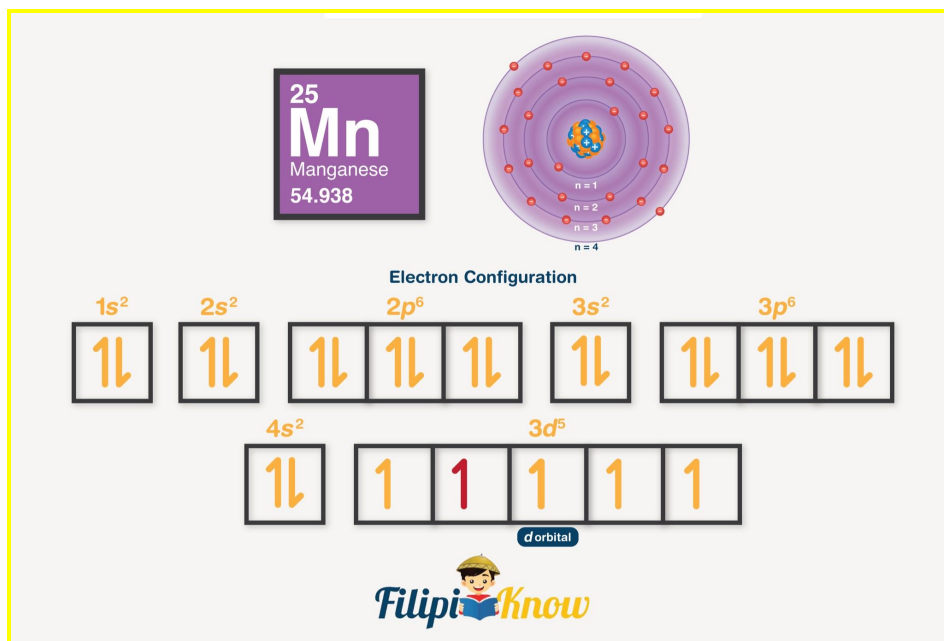
2. Which of the following correctly arranges the given orbitals from first orbital to last orbital to be filled with electrons?
 - a. $4f < 5d < 6p < 6s$
 - b. $5d < 4f < 6p < 6s$
 - c. $6s < 4f < 5d < 6p$
 - d. $6s < 5d < 4f < 6p$

3. One of the sets of quantum numbers below is impossible. Which one is it?
 - a. (1, 1, 0, $+\frac{1}{2}$)
 - b. (2, 1, -1, $-\frac{1}{2}$)
 - c. (3, 2, 0, $+\frac{1}{2}$)
 - d. (4, 0, 0, $-\frac{1}{2}$)

For questions 4 and 5, consider the 25th element in the periodic table, Mn.

4. What is the electron configuration of Mn?
 - a. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^2$
 - b. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 4d^5$
 - c. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5$
 - d. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^1$

5. Which of the following set of quantum numbers corresponds to the labeled electron (marked red below) in the *d* orbital of Mn?



- a. (3, 2, -1, +1/2)
- b. (3, 2, +2, +1/2)
- c. (4, 2, -1, +1/2)
- d. (4, 2, +2, +1/2)