

1. Which of the following explains why the electron configuration below cannot exist?



- A) Hund's rule
 B) Pauli exclusion principle
 C) Heisenberg uncertainty principle
 D) Bohr's model of the atom
 E) It can exist
2. Which of the following explains why the electron configuration below cannot exist?
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- A) Hund's Rule
 B) Pauli exclusion principle
 C) Heisenberg uncertainty principle
 D) Rutherford's empty space model
 E) It can exist
3. Which of the following is the correct electron configuration for a neutral atom of oxygen in the ground state?
- A) $1s^2 2p^4$ B) $1s^2 2s^4$
 C) $1s^2 2s^2 2p^2$ D) $1s^2 2s^2 2p^4$
 E) $1s^2 2s^2 2p^6 3s^2 3p^4$
4. Which of the following could not represent the electron configuration of a neutral atom in the ground state?
- A) $1s^2 2s^2 2p^6 3s^2 3p^4$ B) $1s^2 2s^2 2p^2$
 C) $1s^2 2s^2 2p^6 3s^3 3p^4$ D) $1s^2 2s^2 2p^6 3s^2$
 E) $1s^2 2s^2 2p^6 3s^1$

5. Base your answer to the following question on the choices below.

- (A) Pauli exclusion principle
 (B) Heisenberg uncertainty principle
 (C) Hund's rule
 (D) Wave nature of matter
 (E) Photoelectric effect

Which states that electrons half fill an orbital with parallel spin, before completely filling it?

- A) A B) B C) C D) D E) E
6. The ground state electronic configuration for an atom of neon, $^{20}_{10}\text{Ne}$, is
- A) $1s^2 2s^2$ B) $1s^2 2s^2 2p^6$
 C) $1s^2 2s^2 2p^6 3s^1$ D) $1s^2 2s^2 2p^6 3s^2 3p^6$
 E) $1s^2 2s^4 2p^4$
7. Which species has the same number of electrons as the magnesium ion, Mg^{2+} ?
- A) Ca^{2+} B) Na^+ C) F D) Ne^+ E) Ba^{2+}
8. The atomic number of an element whose electronic configuration is $1s^2 2s^2 2p^1$ is
- A) 1 B) 2 C) 3 D) 4 E) 5
9. The electronic configuration of the S^{2-} ion is
- A) $1s^2 2s^2 2p^6 3s^2 3p^2$ B) $1s^2 2s^2 2p^6 3s^2 3p^4$
 C) $1s^2 2s^2 2p^6 3s^2 3p^5$ D) $1s^2 2s^2 2p^6 3s^2 3p^6$
 E) $1s^2 2s^2 2p^6 3s^4 3p^4$
10. The electronic configuration of the neon atom, $^{20}_{10}\text{Ne}$, is
- A) $1s^2 2s^2 2p^6$
 B) $1s^2 2s^2 2p^6 3s^1$
 C) $1s^2 2s^2 2p^6 3s^2$
 D) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^2$
 E) $1s^2 2s^2 2p^6 3s^2 3p^8$
11. The shell electron configuration of nitrogen, ^7N , is
- A) 2, 5 B) 2, 7
 C) 2, 8, 4 D) 2, 8, 5
 E) 5, 2

12. Lithium, ${}^3\text{Li}$, has the ground state electron configuration of
- A) $1s^22s^1$ B) $1s^22s^2$
C) $1s^22s^2$ D) $1s^22s^22p^63s^1$
E) $2s^3$
13. Potassium ion, K^+ has the same electronic structure as a neutral atom of
- A) argon B) calcium
C) sulfur D) xenon
E) neon
14. In the excited state, a possible electron configuration of aluminum, ${}_{13}\text{Al}$, is
- A) $1s^22s^22p^63s^3$
B) $1s^22s^22p^63s^23d^1$
C) $1s^22s^22p^63s^23p^1$
D) $1s^22s^22p^63s^23d^64s^24p^1$
E) $1s^22s^22p^63s^23p^2$
15. The electron configuration $1s^22s^22p^63s^13p^1$ could represent a
- A) sodium ion
B) manganese atom
C) calcium atom in the ground state
D) sodium ion in an excited state
E) magnesium atom in an excited state
16. How many *subshells* are shown in this configuration?
- $1s^22s^22p^63s^23p^63d^74s^2$
- A) 4 B) 7 C) 12 D) 15 E) 27
17. Which is an 'impossible' configuration?
- A) $1s^22s^22p^63s^23p^6$
B) $1s^22s^22p^63s^23p^63d^{10}4s^04p^1$
C) $1s^22s^22p^93s^23p^63d^{10}4s^24p^2$
D) $1s^22s^22p^63s^23p^63d^{10}4s^24p^3$
E) $1s^22s^22p^63s^23p^4$
18. Which is an *impossible* configuration?
- A) $1s^22s^22p^63s^23p^6$
B) $1s^22s^22p^63s^33p^63d^{10}$
C) $1s^22s^22p^63s^23p^63d^54s^2$
D) $1s^22s^22p^63s^23p^63d^{10}4s^25s^2$
E) $1s^22s^22p^63s^23p^64s^1$
19. How many electrons are in *each* orbital of a completed 3d-sublevel?
- A) 2 B) 6 C) 10 D) 14 E) 18
20. What is the maximum number of subshells in the 3rd energy level of an atom?
- A) 2 B) 3 C) 8 D) 9 E) 18