

LPUNEST - Ph.D. Chemistry
(Sample Questions)

QUESTION 1 Which of the following does not have the ground-state configuration $1s^2 2s^2 2p^6$?

- Option A Ne
- Option B Na^+
- Option C Cl^-
- Option D F^-

QUESTION 2 Which of the following contains an atom (other than hydrogen) which lacks an octet of valence electrons

- Option A NH_3
- Option B H_3O^+
- Option C BH_3
- Option D NH_4^+

QUESTION 3 Which of the following statements is wrong?

- Option A When two orbitals overlap in-phase with each other, a bonding molecular orbital forms
- Option B When two orbitals overlap out-of-phase with each other, an antibonding molecular orbital forms
- Option C When one of two atoms connected by a σ bond rotates about the bond axis, orbital overlap is lost
- Option D When one of two atoms connected by a π bond rotates about the bond axis, orbital overlap is lost

QUESTION 4 Which of the following statements is false?

- Option A The π molecular orbitals of buta-1,3-diene are derived from 2p atomic orbitals of carbon atoms, and there are four of them
- Option B Any orbital can accommodate up to two electrons, so buta-1,3-diene has eight π electrons
- Option C The complete set of molecular orbitals obtained by combining atomic orbitals includes an increased number of nodes
- Option D Some orbitals do not have any nodes

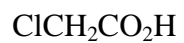
QUESTION 5

Which compound is most acidic?

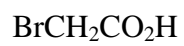
Option A



Option B



Option C



Option D

