

1. A neutral atom with atomic number 6 will have 6 electrons and 6 protons.
2. The maximum number of electrons that can exist in an given atom shell n is calculated by the formula

$$N = 2n^2$$

This means that the maximum number of electronics in the third shell of an atom is

$$2 \cdot 3^2 = 2 \cdot 9 = 18$$

3. Materials are categorized into three groups called isolators, semiconductors, and conductors. Isolators have the largest band gap between the conduction band and valence band. Semiconductors will have a smaller band gap than isolators. Conductors have an overlap between the conduction band and the valence band.