

Q18. Out of the following pairs of electrons, identify the pairs of electrons present in degenerate orbitals:

(a) (i) $n = 3, l = 2, m_l = -2, m_s = -1/2$

(ii) $n = 3, l = 2, m_l = -1, m_s = -1/2$

(b) (i) $n = 3, l = 1, m_l = 1, m_s = +1/2$

(ii) $n = 3, l = 2, m_l = 1, m_s = +1/2$

(c) (i) $n = 4, l = 1, m_l = 1, m_s = +1/2$

(ii) $n = 3, l = 2, m_l = 1, m_s = +1/2$

(d) (i) $n = 3, l = 2, m_l = +2, m_s = -1/2$

(ii) $n = 3, l = 2, m_l = +2, m_s = +1/2$

Sol: (a, d) Degenerate orbitals mean the orbitals of the same sub-shell of the same main shell, i.e., their n and l values are the same. Other two pairs have different values of n and l hence, cannot be having the same energy.