

22.3.1: i. Review Exercises

Q1

For the given orbital occupations (configurations) of the following systems, determine all possible states (all possible allowed combinations of spin and space states). There is no need to form the determinantal wavefunctions simply label each state with its proper term symbol. One method commonly used is Harry Grays "box method" found in **Electrons and Chemical Bonding**.

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|-----|--------|---|------------|
| a.) | CH_2 | $1a_1^2 2a_1^2 1b_2^2 3a_1^1 1b_1^1$ | (22.3.1.1) |
| b.) | B_2 | $1\sigma_g^2 1\sigma_u^2 2\sigma_u^2 1\pi_u^1 2\pi_u^1$ | (22.3.1.2) |
| c.) | O_2 | $1\sigma_g^2 1\sigma_u^2 2\sigma_g^2 2\sigma_u^2 1\pi_u^4 3\sigma_g^2 1\pi_g^2$ | (22.3.1.3) |
| d.) | Ti | $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 d^1 4d^1$ | (22.3.1.4) |
| e.) | Ti | $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^2$ | (22.3.1.5) |

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