**CHM102**

**Assignment**

**April 15, 2017**

1. In the configurations given in the last assignment, also indicate the spin-orbit multiplets and predict the term state which will be the lowest energy state.

1. He: 1s12p1
2. B:1s22s22p1
3. C:1s22s22p13p1
4. F:1s22s22p5
5. Ne: B:1s22s22p6
6. C: B:1s22s22p2
7. Given that the term states for carbon are 3P, 1S and 1D, what would the term states be for sulphur. What would be the difference between the carbon ground state and the sulphur ground state. Explain your answer.

1. In the table given below, group molecules in column A with those in column B that you think belong to the same symmetry group.

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| --- | --- | --- | --- |
|  | **Group A** |  | **Group B** |
| i | H2S | a | BF3 |
| ii | CHF2Cl | b | 280px-Cyclobutadiene_structure |
| iii | 150px-1%2C3%2C5-Trichlorobenzene | c | Phenanthrene  |
| iv | Ethylene (C2H4) | d | NOCl  |
| v | CH3Cl | e | 100px-Naphthalene-2D-Skeletal |
| vi |  | f | ANd9GcQVvwmhxaJIgc0_24s1VDZnLfByVa27CXS6oBC87QBouqDYhCuz |
|  |  | g | Description: File:Furan-2D-numbered.svg |
|  |  | h | NH3 |
|  |  |  | 541-73-1 |