

Be sure to show all work, use the correct number of significant figures, circle final answers and use correct units in all problems.

---

1. For the molecules  $B_2$  and  $B_2^{2-}$ :
  - a. Draw molecular orbital energy level diagrams. (6 points)
  - b. For each molecule determine the bond order *and* magnetic properties (para-/dia-magnetic) (2 points).
  - c. Which has the longer bond? (1 point)
  - d. Which has the highest bond energy? (1 point)

2. Provide names or structures for the following organic molecules: (10 pts)

3-methylhexane <i>structure:</i>	2-pentanone <i>structure:</i>	cyclobutyl bromide <i>structure:</i>

$CH_3CH_2CH_2OH$	$C_6H_6$	$CH_3-O-CH_2CH_2CH_3$

2-heptyne <i>structure:</i>	toluene <i>structure:</i>	acetone <i>structure:</i>

ethanal <i>structure:</i>