

**CH301H: Principles of Chemistry I: Honors**  
 Fall 2015, Unique 49310

**Quiz 5, 10 November 2015**

- a) Draw the molecular orbital (MO) diagram of H<sub>2</sub>O.
- b) Draw the structure of H<sub>2</sub>O, being as explicit about three dimensional geometry as possible. Feel free to annotate your drawing to convey your meaning if necessary.

The following information may be useful:

$$q = 1.602 \times 10^{-19} \text{ C}$$

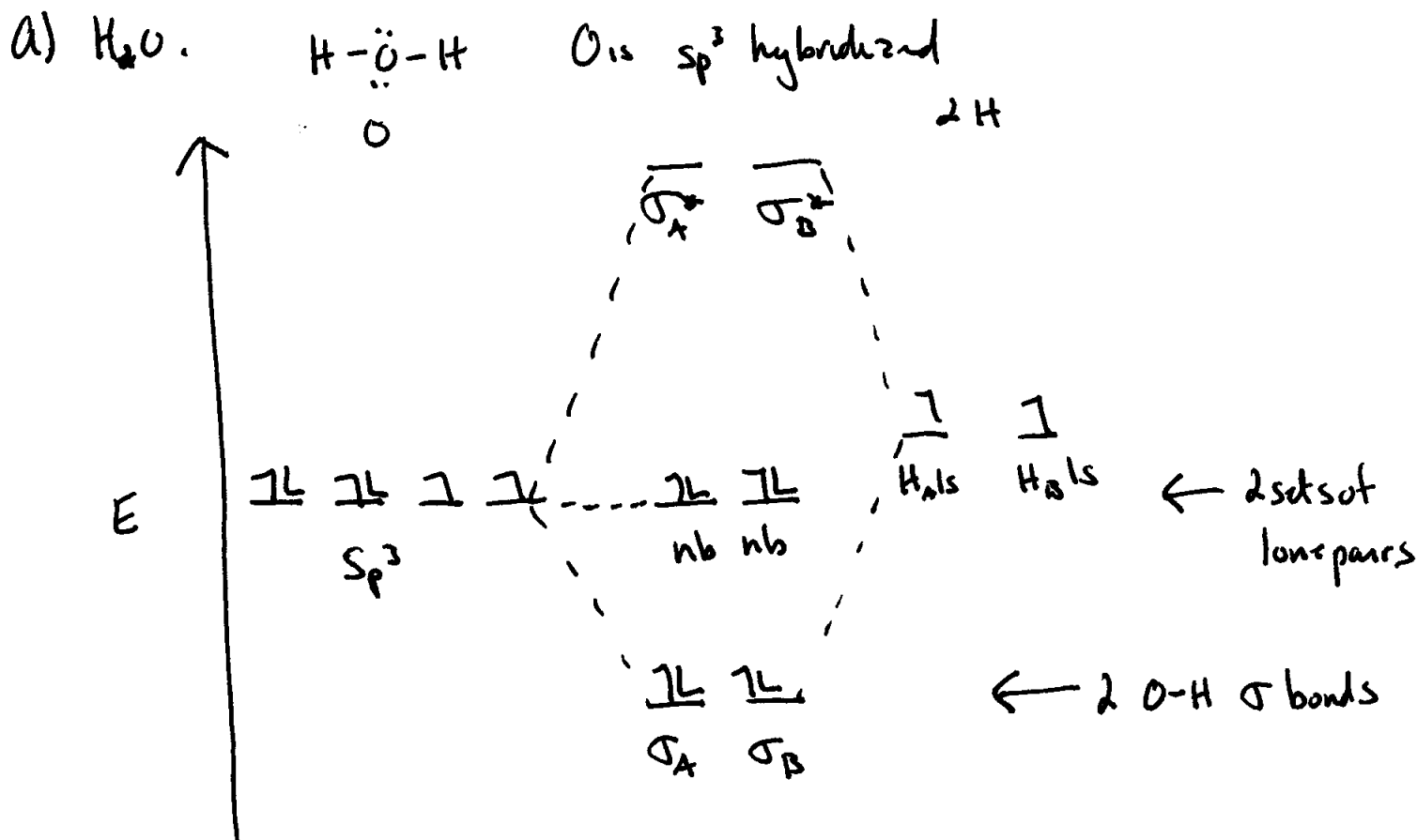
$$\epsilon_0 = 8.854 \times 10^{-12} \text{ C}^2 \text{ J}^{-1} \text{ m}^{-1}$$

$$m_e = 9.11 \times 10^{-31} \text{ kg}$$

$$h = 6.626 \times 10^{-34} \text{ J s}$$

$$c = 3.0 \times 10^8 \text{ m s}^{-1}$$

$$a_0 = 0.529 \times 10^{-10} \text{ m}$$



# Quiz 5 continued

b)



The  $sp^3$  hybrids are arranged in a tetrahedron around the central O atom. The measured bond angle between H-O-H will be slightly less than  $109^\circ$ .