1. Generate the following two equations using $\dfrac{\partial E}{\partial C_1} = 0$ and $\dfrac{\partial E}{\partial C_2} = 0$

$$C_1\ (H_{AA} - E) + C_2\ (H_{AB} - ES)\ =\ 0 \quad \text{Equation 1}$$

$$C_1\ (H_{AB} - ES) + C_2\ (H_{AA} - E)\ =\ 0 \quad \text{Equation 2}$$

2. Substituting the energy values we obtained in class for H_2^{+} in the following equations, obtain a relationship between C_1 and C_2.

$$C_1\ (H_{AA} - E) + C_2\ (H_{AB} - ES)\ =\ 0 \quad \text{Equation 1}$$

$$C_1\ (H_{AB} - ES) + C_2\ (H_{AA} - E)\ =\ 0 \quad \text{Equation 2}$$

3. Using the relationships you obtained in (2) above and the following facts, calculate the values of C_1 and C_2.

    o $\psi = C_1\ 1S_A + C_2\ 1S_B$

    o   The wave function ψ is normalized.

4. Write the complete wave functions you obtained in (3) above. Then draw a rough sketch of these wave functions.