1. (10 points) Using any piece that contributes three or fewer carbons to the final product, outline a synthesis of A.

![Diagram of A]

2. (10 points) Draw the structure of C, and the mechanism for its formation from B.

![Diagram of B and C]

**C**<sub>10</sub>H<sub>12</sub>O<sub>3</sub>  IR: 2826, 2749, 2238, 1706, 1691, 1640 cm<sup>-1</sup>

**<sup>1</sup>C NMR:**
- 193.3, d
- 154.0, s
- 153.3, d
- 133.8, d
- 86.2, s
- 74.1, s
- 61.8, t
- 30.2, t
- 17.2, q
- 13.8, t

**<sup>1</sup>H NMR:**
- 9.49, d, J = 7.7 Hz, 1H
- 6.81, dt, J = 15.7, 6.1 Hz, 1H
- 6.13, dd, J = 7.7, 15.7 Hz, 1H
- 4.16, q, J = 7.1 Hz, 2H
- 2.6, m, 2H
- 2.4, m, 2H
- 1.25, t, J = 7.1 Hz, 3H

3. (10 points) Draw an arrow-pushing mechanism for the conversion of D to E.

![Diagram of D and E]

**Dibal;**

**H<sup>+</sup>/H<sub>2</sub>O work up**

**bb**

**bf**