1. (10 points) Using any piece that contributes three or fewer carbons to the final product, and any monosubstituted benzene derivative that contributes at most seven carbons to the final product, outline a synthesis of $\bf A$.

Α

2. (10 points) Deduce the structure of C, and draw an arrow-pushing mechanism for its formation.

| ¹³ C NMR | ¹ H NMR |
|---------------------|--------------------------|
| 21.6, q | 1.41, d, J=6.0 Hz, 3H |
| 29.6, t | 1.9, m, 1H |
| 30.3, t | 2.4, m, 1H |
| 77.9, d | 2.6, m, 2H 4.6, m, 1H |
| 177.9, s | 4.0, 111, 117 |

3. (10 points)Draw an arrow-pushing mechanism for the conversion of ${\bf D}$ to ${\bf E}$.

