Synthesis Problems

(1) Please propose a synthesis for the molecules on the right using the starting materials on the left and any one-carbon organic molecules.

(2) Please propose a synthesis for each of the following compounds, starting with benzyl alcohol (PhCH₂OH) and with alcohols that contain three or fewer carbons.

(a) \( \text{Me} - \text{C} = \text{C} - \text{H} \)  
(b) \( \text{Me} - \text{C} = \text{C} - \text{Ph} \)  
(c) \( \text{Me} - \text{C} = \text{C} - \text{Me} \)  
(d) \( \text{Ph} - \text{C} = \text{C} - \text{Me} \)  
(e) \( \text{Me} - \text{C} = \text{N} - \text{Me} \)  
(f) \( \text{Ph} - \text{C} = \text{C} - \text{Me} \)

(3) Please synthesize the illustrated ketone. ALL carbons of the ketone must be derived from molecules of methyl acetate, which has three carbons. You may not use lithium diisopropylamide in your synthesis.