1. (6 points) For the following acid-base reactions, provide the anionic organic products from the deprotonation and predict which side (reactants or products) would be favored at equilibrium.

(a) \( \text{Ph}^- \text{CH}_3 \) + NaOH

(b) \( \text{Ph} \text{C} = \text{O} \text{CH}_3 \) + NaOH

(c) \( \text{Ph}^- \text{CH}_3 \) + \( \text{N} \text{Li}^- \)

2. (6 points) Provide the organic products of the following reactions. If there is more than one product, predict which, if any, will be major.

(a) \( \text{PhCHO} \) exess + \( \text{HCH}_3 \) → NaOH, heat

(b) \( \text{PhCH}_3 \text{O} \) → 1. NaOEt (1 eq.)
2. \( \text{H}_3\text{O}^+ \) (workup)

(c) \( \text{H}_3\text{C} = \text{O} \text{O} \text{O} \text{H} \) → NaOH, heat

3. (3 points) Provide the ester which could yield the following \( \beta \)-keto ester upon self-condensation in a Claisen reaction.

2 → 1. NaOMe (1 eq.)
2. \( \text{H}_3\text{O}^+ \) (workup)