

- Consider the following compounds

Suggest reasonable explanations for each of the following observations:

(a) Optically active piperitone ($\alpha_D -32^\circ$) is converted to racemic piperitone on standing in a solution of sodium ethoxide in ethanol.

(b) Menthone is converted to a mixture of menthone and isomenthone on treatment with 90% sulfuric acid.

- Identify the reagents for the following transformations:
- Starting from the following ketone, propose a set of transformations to give you the epoxide
- Write out the product of the following reaction:
- Prepare the following compound from benzaldehyde and propanal
- Write out the products of the following reaction
- Outline a mechanism for the following reaction
- Provide a rationale for the following observation
- The reaction between 2-pentanone and benzaldehyde in the presence of base gives a mixture of two aldol products. Can you identify them?
- What are the major products formed when the following compound is reacted with a base?
- When the aldol reaction is carried out at high concentrations of hydroxide, the rate law is found to be:

$$\text{Rate} = k[\text{aldehyde}]^2[\text{Base}]$$
 Provide a rationale for this observation

Write the structure of the aldol addition product of

