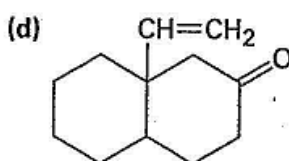
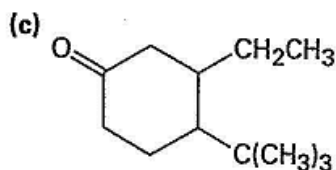
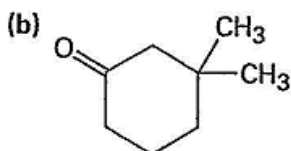
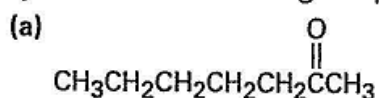


**Problem 19.10**

Show the products you would obtain by acid-catalyzed reaction of cyclohexanone with ethylamine,  $\text{CH}_3\text{CH}_2\text{NH}_2$ , and with diethylamine,  $(\text{CH}_3\text{CH}_2)_2\text{NH}$ .

**Problem 19.22**

How might conjugate addition reactions of lithium diorganocopper reagents be used to synthesize the following compounds?

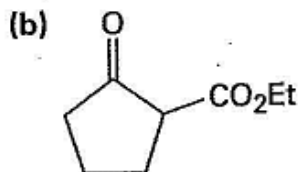
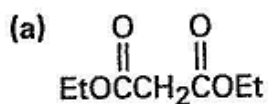
**Problem 23.16**

What product would you obtain from a base-catalyzed Michael reaction of 2,4-pentanedione with each of the following  $\alpha,\beta$ -unsaturated acceptors?

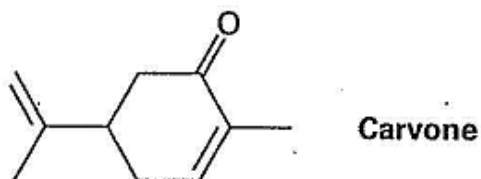
- (a) 2-Cyclohexenone      (b) Propenenitrile      (c) Ethyl 2-butenoate

**Problem 23.17**

What product would you obtain from a base-catalyzed Michael reaction of 3-buten-2-one with each of the following nucleophilic donors?

**Problem 19.40**

Carvone is the major constituent of spearmint oil. What products would you expect from reaction of carvone with the following reagents?



- |  |   |
|--|---|
| (a) $(\text{CH}_3)_2\text{Cu}^- \text{Li}^+$ , then $\text{H}_3\text{O}^+$ | (b) $\text{LiAlH}_4$ , then $\text{H}_3\text{O}^+$                  |
| (c) $\text{CH}_3\text{NH}_2$   | (d) $\text{C}_6\text{H}_5\text{MgBr}$ , then $\text{H}_3\text{O}^+$ |
| (e) $\text{H}_2/\text{Pd}$   | (f) $\text{CrO}_3, \text{H}_3\text{O}^+$                            |
| (g) $(\text{C}_6\text{H}_5)_3\text{P}^{\pm}\text{CHCH}_3$                  | (h) $\text{HOCH}_2\text{CH}_2\text{OH}, \text{HCl}$                 |