Problem
$$20-1$$
.

(a) $\frac{\text{cl/s}}{\text{cl/s}} - \frac{\text{cl/s}}{\text{cl/s}} - \frac{\text{cl/s}}{\text{cl/s}} - \frac{\text{cl/s}}{\text{cl/s}}$

3 - Methyl but anolic acid.

(b)
$$cH_3 - cH_2 - cH_3 - cH_$$

4 - Bromopontamole acld

2- Ethylpontamole acld.

(d)
$$\frac{1}{1} = \frac{1}{1} =$$

(Z) - 4 - Hexonolc acld.

(e)
$$cH_3 - cH_2 - cH_3$$
 2. 4 - Dimethyl pen famen Hile. 5 4 3 2

Cis - 1.3 - Cy clopentane di cer boxylle acid. Problem 20-10

(a)
$$\frac{\text{cl}_3}{\text{cl}_3 - \frac{1}{\zeta} - \text{cl}} + \frac{\text{Mg}}{\text{Mg}} \rightarrow \frac{\text{cl}_3}{\text{cl}_3 - \frac{1}{\zeta} - \text{Mgcl}}$$

$$\frac{\text{cl}_3}{\text{cl}_3} + \frac{\text{cl}_3}{\text{cl}_3} + \frac{\text{$$

$$\rightarrow \frac{cl_{3}-c}{cl_{3}-c} = \frac{cl_{3}-c}{c} = \frac{cl_{3}-c}{c$$

(b)
$$d_{3}-d_{2}-d_{2}-B_{3}$$
. $+ M_{9} \rightarrow d_{3}-d_{2}-d_{2}-M_{9}B_{7}$.

Bromopropone

 $d_{3}-d_{2}-d_{2}-B_{3}$. $+ d_{3}-d_{2}-d_{2}-d_{2}-d_{2}-d_{2}-d_{3}-d_{3}-d_{3}-d_{2}-d_{3}-d_{2}-d_{3}-d$

Problem 20-11.-1.

Ptoblem 20-11 - 2.

(b) Hydrolysis of 11H nittiles.

Bromomethylbonzone 2-phonylacetonHrile

430 - C = MI A A O C = MH + SY 4

Toutomer; zatlon ON HI ON HILD:

-> Or all, - c - MH2 proton transfer or al, - c - MH2

LIAIHA LIAIHA (0) CH3-CH3-CH3-OH 2 - phonylethanol.

problem 20-12-1.

a: How to increase or add the one methyl on this structure 3.

First step: convert the alcohol to alkyl halide.

Three method 1) MX

2) PBr3

3) Sod2.

2) þ Br3

Problem 20-12-2

3) 500/2

$$\rightarrow \langle \rangle^{ch} - 2 \langle y \rangle^{H}$$

$$\rightarrow \qquad \qquad + 50_2 + C1^{-1}$$

Conclusion

$$\begin{array}{c} & & & \\ & &$$

3) 500/2

Problem 20-12-3

Second stop: convert the alkyhalide to alcohol.

Two methode. 1) and Grignard Reagent.

2) Hydrolysis of Mittiles.

$$\rightarrow \langle \rangle dh - c - o + 2 \rightarrow \langle \rangle dh - c + 4 \rightarrow 0$$

2) Hydrolysis of Mittiles. CH2-X MaC=H C=H: + Mat-Bt. 2- Golophantylacetonittile. H30+ - C=H0+ H30H -> CH3-C=M-H $\Rightarrow \langle \rangle^{\alpha l_2 - c = \ddot{\mathcal{H}} - \mathcal{H}} + \mathcal{O}^{\alpha l_2 - c = \ddot{\mathcal{H}} - \mathcal{H}}$ tantomorization

All - C - M-H

H 10: It needs several steps to add one carbon.

Problem 20-12-4.

$$\rightarrow R - c = \cancel{A} - H + 3$$

$$\Rightarrow R - c = N + Base$$

$$\rightarrow R - C = \ddot{N} + \frac{0}{0}$$

Hydrolysis: conversion of Mittles Into Amines

$$R - C = \ddot{H} - H$$

$$+ \frac{1}{100} \Rightarrow R - \frac{1}{100} + \frac{1}{100} + \frac{1}{100} = \frac{1}{100}$$

R- COH + 7/1/4

Reduction: Conversion of Mittiles Into Ammes

$$R - C = H: + L: + ZIH_4$$

$$\rightarrow R - \frac{1}{4} - \frac{1}{4} - \frac{1}{4} + \frac{1}{4} = 0$$

$$\rightarrow R - \frac{1}{4} - \frac{1}{4}$$
: (Anime.)

Reaction of Nittiles with Grignard Reagents.

$$R_1 - C \equiv H: + R_2 - \frac{M_9}{5} X$$

$$\rightarrow R_1 - C = H_1 \oplus M_9 X + H_{-0i}$$

$$\longrightarrow R_1 - C = 10 + 40^{-10} \text{ Mg} X$$

Problem 20-13-1

(a) Nittile -> Ketone.

" Reaction of nittles with Grignard Reaction.".
reagants.

 $CH_3 - CH_2 - C \equiv H$; + $CH_3 - CH_2 - M_9 \times$.

propiononittile.

5 57

 $\rightarrow \qquad cH_3 - cH_2 - c = \overrightarrow{H}_i \qquad M_g \times . \qquad + \qquad H - \overrightarrow{G}_i$ $cH_2 - cH_3 \qquad \qquad H$

 $- > CH_3 - CH_2 - \frac{1}{6} - \frac{1}{4} + \frac{1}{60} - \frac{1}{4}$ $- \frac{1}{60} - \frac{1}{4} + \frac{1}{60} - \frac{1}{4}$ $- \frac{1}{60} - \frac{1}{4} + \frac{1}{60} - \frac{1}{4}$

 $\frac{+ H_2 O}{\Rightarrow} \qquad cH_3 - cH_2 - cH_3 - cH_3 - cH_3 + H_3 O$ 3 - pen + conone

Problem 20-13-2.

1- (4-nittophonyl) ethanone

Mittile > Ketone.

" Reaction of nitiles with Grignard Reagents "

Case I

 $C \equiv M^{\dagger} + CH_3 - M_9 X$

4-nitrobenzonittik

(use I

+ : N = CH. -> This one make Hydrogen Gamide the aldehyde.

Case I

+ : N = C - CH3. acetonittle

12 to blom 20-14.