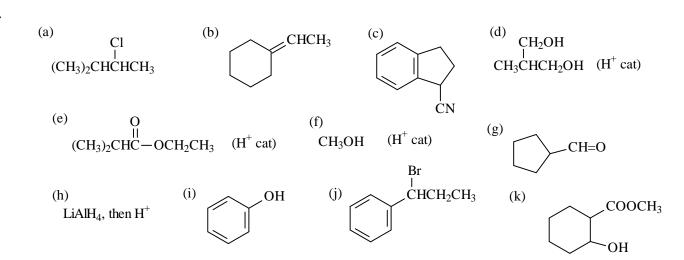
FINAL EXAMINATION, 59-135 1992

1.



2. (i) diastereomers; (a)

(ii) diastereomers;

(iii) identical; (iv) diastereomers

(b) Top carbon priorities are: OH > CHO > chain > H, Config = \underline{S}

Middle carbon priorities are:

 $OH > C(CHO) > C(OH) > H Config = \underline{S}$

Bottom Carbon priorities are: OH > chain > CH₃ > H

(a)

Config = $\underline{\mathbf{R}}$

(c) CH_3 -ОН H--Br -OH

H-

(d)

ĊH₃

3.

4. (a) The two compounds are

These are diastereomers and they are formed because the addition of HBr can be either *cis* or *trans*. (b)

(c) The product has the structure

It is formed by *trans* addition because the iodonium ion can form and direct the incoming nucleophile to the opposite side of the molecule. The more positive part of the molecule (i) becomes attached to the less substituted carbon.

$$(CH_3)_2CHCH_2CH_2MgBr + CH_3OH \xrightarrow{\text{then H}^+}$$

$$(CH_3)_2CHCH_2CH=CH_2 + BH_3 \xrightarrow{\text{then H}_2O_2/OH}$$

$$(CH_3)_2CHCH_2CH_2CH_2Br + OH \xrightarrow{\text{Ni}}$$

$$(CH_3)_2CHCH_2CH_2CH=O + H_2 \xrightarrow{\text{Ni}}$$

$$(CH_3)_2CHCH=CHCH_2OH + H_2 \xrightarrow{\text{Ni}}$$

6. (a) The second reaction will be Sn2 because the intermediate in the first reaction can be resonance stabilized.

- (b) NEITHER!! These are Sn1 reactions and the rate will not depend on the nucleophile
- (c) The first reaction CANNOT give an optically active product. Therefore the only reaction that can possibly give an optically active product is the second one.

7.

$$(CH_3)_2CHCH_2CH_2MgBr + CH_3OH \xrightarrow{\text{then H}^+}$$

$$(CH_3)_2CHCH_2CH=CH_2 + BH_3 \xrightarrow{\text{then H}_2O_2/OH}$$

$$(CH_3)_2CHCH_2CH_2CH_2Br + OH \xrightarrow{\text{CH}_3}$$

$$(CH_3)_2CHCH_2CH_2CH=O + H_2 \xrightarrow{\text{Ni}}$$

$$(CH_3)_2CHCH=CHCH_2OH + H_2 \xrightarrow{\text{Ni}}$$