CHAPTER 12: Alcohols and Ethers

1 What is the product of the following reaction?

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

Which of the following is <u>not</u> a good method to make *tert*-butyl methyl ether?

1)
$$(CH_3)_3CO^*Na^+ + CH_3Br \longrightarrow$$
2) $(CH_3)_3CBr + CH_3O^*Na^+ \longrightarrow$
3) $H_2C=C(CH_3)_2 + CH_3OH \xrightarrow{\text{heat}}$
4) $(CH_3)_3CBr + CH_3OH \xrightarrow{\text{heat}}$

4 What is the major product of the following reaction?

 CH_3

Which one of the following reactions makes the cyclic ether shown below?



$$OH ext{H}_2SO_4$$

- 3) HO NaOH
- 4) Br H₂O, H₂SO₄
- 6 What are the products of the reaction below?

1)
$$CH_2I$$
 + CH_3OH CH_2I + CH_3I

OH
$$I$$
 CH_2OH I CH_2I CH_2I CH_2I

7 The reaction shown below can be described as an:

$$\begin{array}{ccc} & OH & & O \\ H_3C-CH-CH_2Br & & \longrightarrow & H_3C-CH-CH_2 \end{array}$$

1) acid-base reaction followed by an intramolecular Williamson ether synthesis.

- 2) acid-base reaction followed by an intramolecular S_N1 reaction.
- 3) E2 reaction followed by an addition reaction to a double bond.
- (4) S_N2 reaction followed by an intramolecular Williamson ether synthesis.
- 8 What is the product of the following reaction?

- (S)-1,2-propanediol 3) racemic mixture of 1,2-propanediol
- 2) (R)-1,2-propanediol 4) 1,3-propanediol
- 9 What is the final product of the following sequence of reactions?

$$(CH_3)_2CHOH$$
 $\xrightarrow{PBr_3}$ \xrightarrow{Mg} $\xrightarrow{1)}$ \xrightarrow{O} \xrightarrow{PCC} $\xrightarrow{CH_2Cl_2}$

- 1) (CH₃)₂CHOCH₂CH₂OH (CH₃)₂CHCH₂CHO
 O
 1)
 2) (CH₃)₂CHCCH₃ 4) (CH₃)₂CHCH₂CO₂H
- 10 What is the product of the reactions below?

1) CH₃CH₂CHCH₂OCH₃
OH

3) CH₃CH₂CHCH₂OH
OH

2) CH₃CH₂CHCH₂OH
OCH₃
CH₃CH₂CHCH₂OH
CH₃
CH₃CH₂CHCH₂OH

- What is the product of the following reaction? 11

1) 1,3-dibromobutane

2 HBr

O

3)1,4-dibromobutane

- 2) 1,3-dibromopropane
- 4) 1,2-dibromopropane
- What is(are) the product(s) of the following nucleophilic ring-opening reaction?

1)
$$\bigcirc$$
 OCHCH₂OH \bigcirc OCH₂CHOH \bigcirc CH₃

OH
$$\begin{array}{c} OH \\ -OCCH_3 \\ CH_3 \end{array} \qquad \begin{array}{c} A) \end{array} \qquad \begin{array}{c} OCHCH_2OH \\ OH \end{array}$$

- 13 Select the strongest base in the following.
 - 1) NaNH₂ 2 CH₃Li 3) NaOCH₂CH₃ 4) HC \equiv CNa
- Which of the following reaction sequences would convert 2-butanol into the deuterated compound below?

1)
$$H_2SO_4$$
 $(1) BD_3/THF$
heat $(2) H_2O_2$, NaOH

2)
$$H_2SO_4$$
 heat D_2/Pt

OH
$$PBr_3 \qquad (1) \text{ Mg, diethyl ether}$$

$$(2) D_2O$$

What is the major product of the following reaction?

CH₃CH₂CHCH₂CH₃
$$\xrightarrow{\text{Mg, diethyl ether}} \xrightarrow{\text{(1) H}_2\text{C=O}} \xrightarrow{\text{(2) H}_3\text{O}^+}$$

- 1) 2-ethyl-1-pentanol
- 2)2-ethyl-1-butanol
- 3) 3-pentanol
- 4) 3-methyl-1-pentanol
- What is the product of the following sequence of reactions? 16

CH₃CH₂C
$$\equiv$$
CH $\xrightarrow{(1) \text{NaNH}_2, \text{NH}_3}$ $\xrightarrow{\text{H}_2}$ $\xrightarrow{\text{CH}_2\text{I}_2}$ $\xrightarrow{\text{CH}_2\text{I}_2}$ $\xrightarrow{\text{C}}$ $\xrightarrow{\text{C}}$

- 1) 1,1-diethylcyclopropane
- 2) trans-1,2-diethylcyclopropane
- 3 *cis*-1,2-diethylcyclopropane 4) *cis* and *trans*-1,1-diiodo-2,3-diethylcyclopropane
- What is the product of the following reaction? 17

Which of the following is the major organic product in the reaction sequence below? 18

$$H_3C-C\equiv CH$$
 $\xrightarrow{CH_3CH_2MgCl}$ $\xrightarrow{1)}$ \xrightarrow{O} \xrightarrow{O} $\xrightarrow{diethyl ether}$ $\xrightarrow{2) H_3O^+}$

HO
$$CH_2CH_3$$
 $CHCH_3$ HO CH_2 HO C CH_3 $CHCH_3$ $CHCH_3$

Propose a plan for the following synthesis (choose necessary reagents)

1)
$$PBr_3$$
 PCl_3 PCl_4 PBr_5 PCl_5 P