

CHEM 2311

E4 practice-i (answers provided)

1. (32 points) Circle the letter *on the right* which corresponds to the answer to each question. There is only one correct answer for each question.

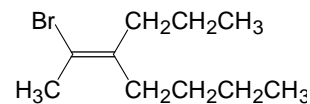
(i) What is the correct systematic name for the following compound?

A. *E*-2-bromo-3-propyl-2-heptene

B. *E*-2-bromo-3-butyl-2-hexene

C. *Z*-2-bromo-3-propyl-2-heptene

D. *Z*-2-bromo-3-butyl-2-hexene



A
B
C
D

(ii) What is the major organic product from the reaction of *trans*-2-bromo-1-methyl-cyclohexane with sodium ethoxide (ethanol solvent) at 80 °C?

E. 1-methylcyclohexene

F. 2-methylcyclohexene

G. 3-methylcyclohexene

H. *cis*-1-ethoxy-2-methylcyclohexene

E
F
G
H

(iii) What is the major product of the reaction of 1,2-dibromobutane with zinc metal

I. 1-butyne

J. 1-butene

K. 2-butyne

L. 1-butanol

I
J
K
L

(iv) Arrange the following compounds in order of *decreasing reactivity* to dehydration upon treatment with hot concentrated sulfuric acid.

i. methanol

ii. 1-propanol

iii. 2-propanol

iv. 2-methyl-2-propanol

M. ii>iii>i>iv

N. i>ii>iii>iv

O. iv>i>ii>iii

P. iv>iii>ii>i

M
N
O
P

(v) Which of the following is the major product obtained by the reaction of 1-butyne with two molar equivalents of hydrogen bromide?

Q. 1,1-dibromobutane

R. 1,2-dibromobutane

S. 2,2-dibromobutane

T. 2-bromo-1-butene

Q
R
S
T

(vi) When propene is treated with hydrogen chloride in ethanol, very little 2-chloropropane is obtained. What is the major organic product? *Use your understanding of mechanisms to predict an alternative product.*

U. 1-chloropropane

V. ethyl propyl ether

W. 2,3-dichloropropane

X. ethyl isopropyl ether

U
V
W
X

(vii) Arrange the following in order of *increasing reactivity* for addition to the double bond of alkenes.

Y. HI < HBr < HCl < HF

Z. HF < HBr < HCl < HI

AA. HF < HCl < HBr < HI

BB. HCl < HBr < HI < HF

Y
Z
AA
BB

(viii) A fragrant compound (**A**) isolated from a flowering plant has the formula $C_{15}H_{24}$. When treated with excess hydrogen and platinum metal, it gives a compound with formula $C_{15}H_{28}$. How many double bonds and/or rings does **A** contain?

CC. one double bond, two rings

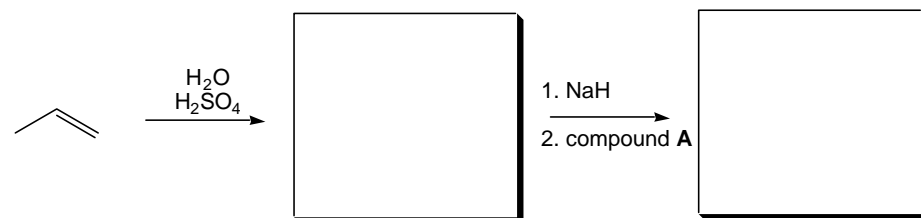
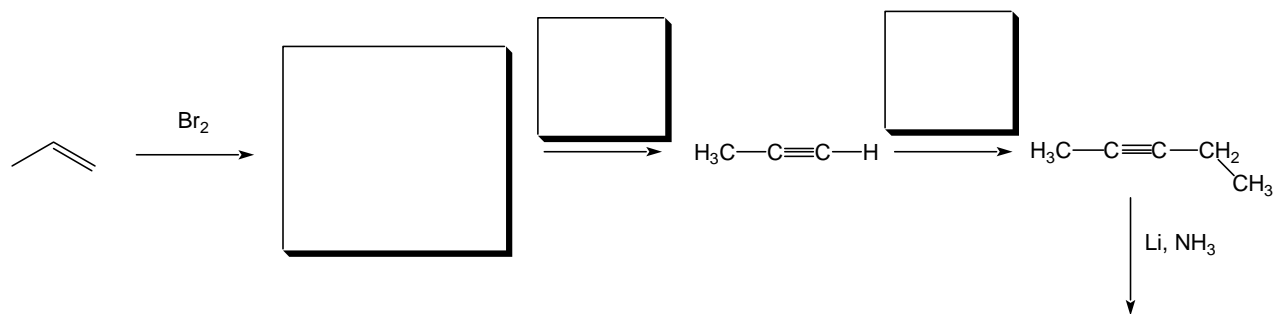
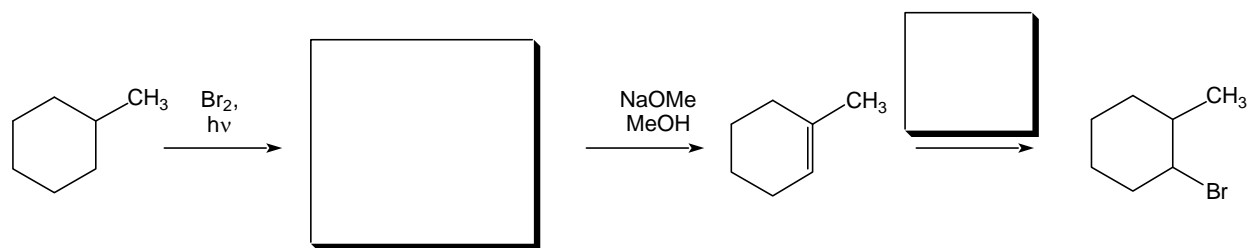
DD. two double bonds, one ring

EE. two double bonds, two rings

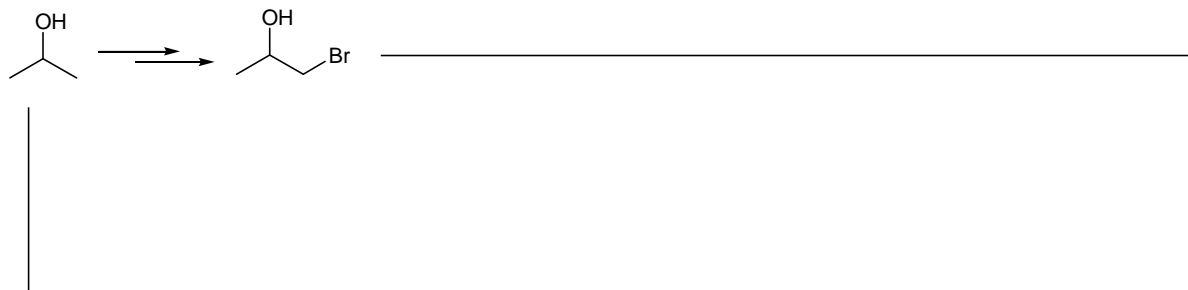
FF. three double bond, one ring

CC
DD
EE
FF

2. Provide the structures and reagents to complete the following reaction schemes.



3. (20 points) The following transformations *cannot* be performed in a single step. Provide sequences of reactions, showing reagents and isolated synthetic intermediates, to achieve each transformation. *PROBLEM SOLVING HINTS: Each of these transformations requires 2-3 steps. Approach this type of problem by asking yourself what the final product can, in fact, be made from. Can this compound be prepared from the given starting material?*



4. (12 points) Compound **W**, C_8H_{14} , undergoes reaction with excess bromine to form compound **X**, $C_8H_{14}Br_2$. Reaction of **W** with ozone, followed by $Zn/HOAc$ affords compound **Z**.

(a) What is the value of SODAR for **W**? _____

(b) What is the structure of compound **W**?

(c) What is the structure of compound **X**?

