Name: _____ **Class:** _____ **Date:** _____ **ID: A**

Orgo1-Test 4

Short Answer

Give the name for each of the following alkyl halides.

1. Name:

   CHI_3

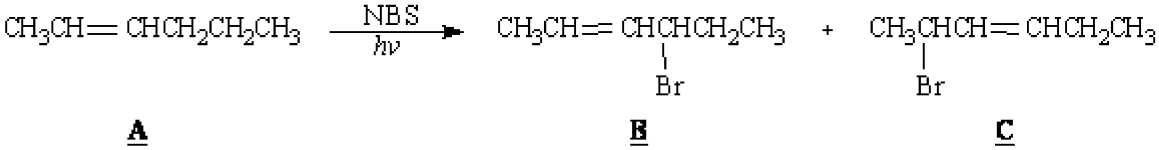
2. Name:

   CH_2Cl_2

Draw structures corresponding to each of the given names.

3. Draw: 3-iodopropene
4. Draw: *trans*-1-chloro-3-*sec*-butylcyclohexane

Experiment 10-4
Consider the reaction below to answer the following question(s).



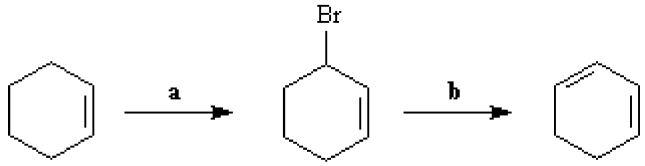
A **B** **C**

5. Refer to Experiment 10-4. Place asterisks(*) at all *allylic* positions in compound **A**.
6. Refer to Experiment 10-4. Draw the resonance forms of the allylic radical intermediate that accounts for the formation of **B** and **C**.

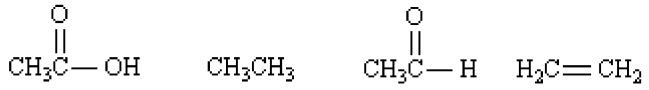
Experiment 10-7
Propose a synthesis of each of the following compounds from the given starting material and any inorganic reagents necessary.

7. 

8. Identify the reagents **a** and **b** in the following scheme.



9. Rank the following compounds in order of *increasing* oxidation level. Place the number rank (1 = lowest; 4 = highest) in the blank below the structure.



_____ _____ _____ _____

Circle your response in each set below.

10. Circle the *best* solvent for an S_N2 reaction.

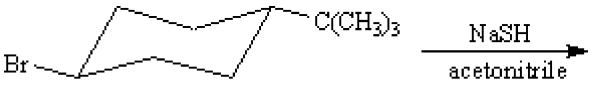
HMPA $CHCl_3$ H_2O CH_3CH_2OH

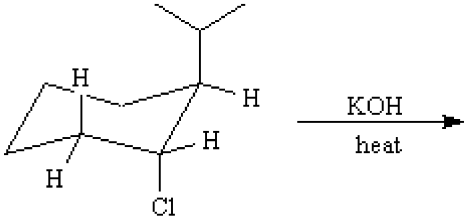
Experiment 11-7
To answer the following question(s) consider the data below:

Reaction of bromomethane with sodium hydroxide in water forms methanol. If sodium iodide is added to the reaction mixture, the rate of methanol formation is dramatically increased (i.e. sodium iodide is a catalyst).

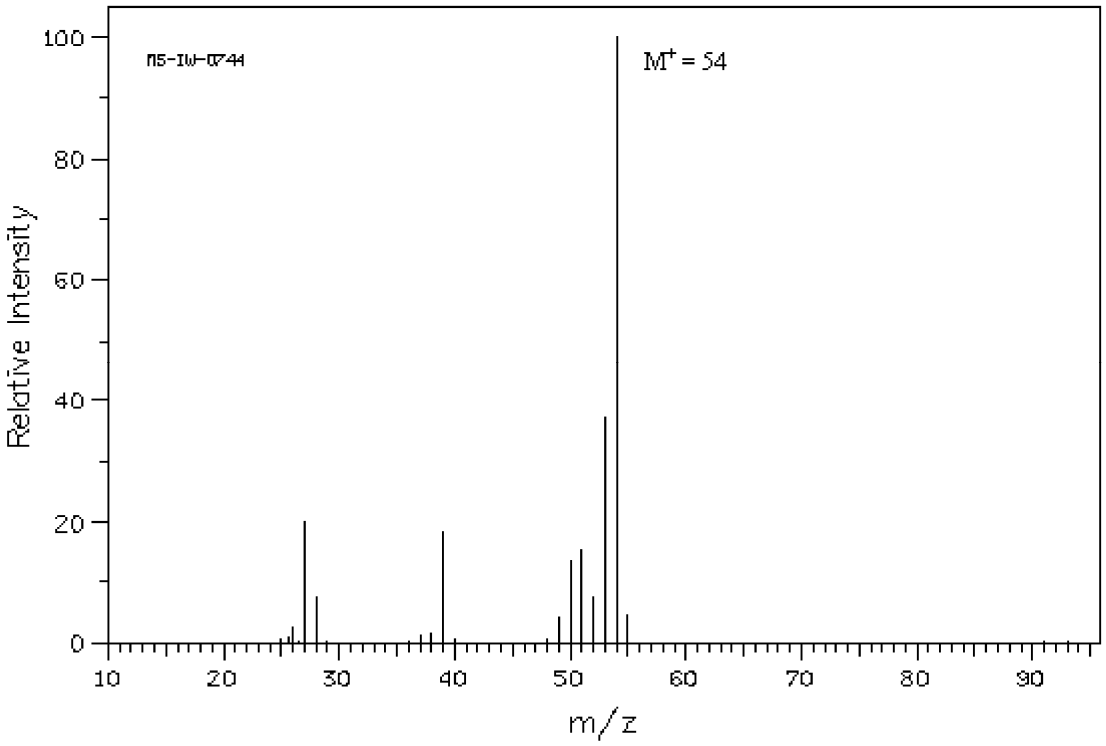
11. Refer to Experiment 11-7. Write a reaction pathway that accounts for the effect of added NaI.
12. Refer to Experiment 11-7. Draw a reaction energy diagram showing the two different reaction pathways (i.e. catalyzed and uncatalyzed). Indicate structures for all energy minima in the diagram.
13. Refer to Experiment 11-7. Explain why adding NaI increases the reaction rate.
14. Refer to Experiment 11-7. Would you expect the same catalytic effect on this reaction if you added NaCl instead? Explain your answer.

Draw the structure of the major organic product(s) for each of the following reactions. Indicate the stereochemistry for each reaction when appropriate.

15. 

16. 

17. Below is the mass spectrum of an unknown hydrocarbon. In addition, this hydrocarbon shows characteristic absorption at 2100 cm^{-1} in its IR spectrum. Give the structure of this unknown.



Spectrum obtained from: SDBSWeb: http://www.aist.go.jp/RIODB/SDBS/

Orgo1-Test 4
Answer Section

SHORT ANSWER

1. ANS:
triiodomethane

PTS: 1

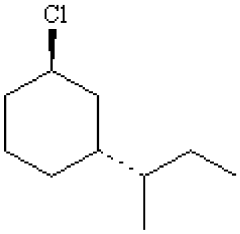
2. ANS:
dichloromethane

PTS: 1

3. ANS:

PTS: 1

4. ANS:



PTS: 1

5. ANS:

$\overset{+}{C}H_3CH{=}CH\overset{+}{C}H_2CH_2CH_3$

A

PTS: 1

6. ANS:

$CH_3CH{=}CH{-}\dot{C}HCH_2CH_3 \longleftrightarrow CH_3\dot{C}H{-}CH{=}CHCH_2CH_3$

PTS: 1

7. ANS:

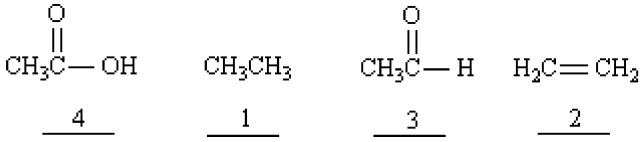
$$CH_3CHCH_2CH_2OH \xrightarrow[\text{ether}]{PBr_3} CH_3CHCH_2CH_2Br \xrightarrow[\text{ethanol}]{KOH} CH_3CHCH{=}CH_2$$

PTS: 1

8. ANS:
a = NBS, *hv* **b** = KOH, ethanol

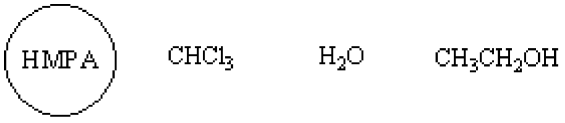
PTS: 1

9. ANS:



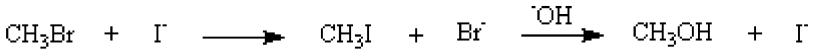
PTS: 1

10. ANS:



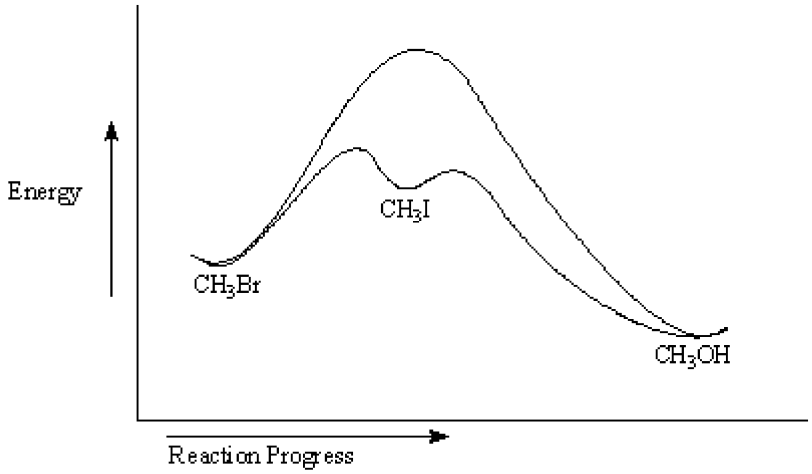
PTS: 1

11. ANS:



PTS: 1

12. ANS:



PTS: 1

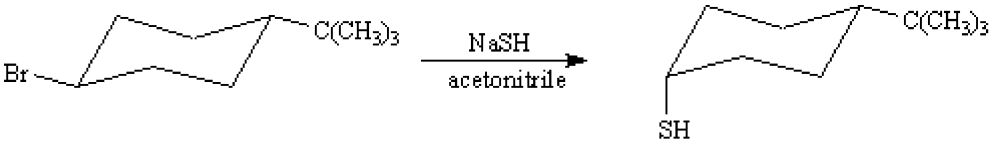
13. ANS:
Iodide is a better nucleophile than hydroxide so we expect reaction between CH_3Br and iodide to proceed faster than the reaction between CH_3Br and hydroxide. CH_3I is a more reactive alkyl halide than CH_3Br because iodide is a better leaving group than bromide so when CH_3I forms it reacts with hydroxide faster than CH_3Br to form CH_3OH. The overall result is faster formation of CH_3OH from CH_3Br when NaI is added.

PTS: 1

14. ANS:
No. Chloride ion is a poorer nucleophile as well as a poorer leaving group than bromide ion.

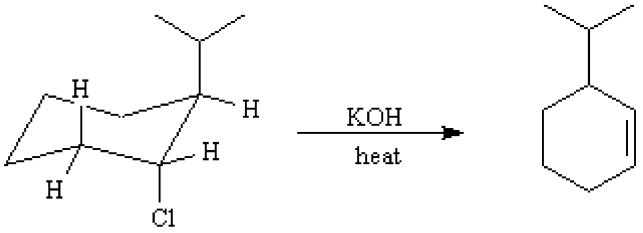
PTS: 1

15. ANS:



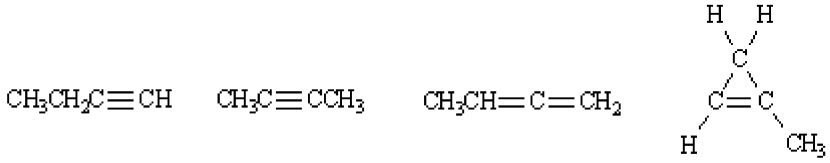
PTS: 1

16. ANS:



PTS: 1

17. ANS:
The formula weight of 54 corresponds to a molecular formula of C_4H_6, which has two degrees of unsaturation. Possible structures for this formula are:



The IR data is consistent with an internal alkyne, so the compound is 2-butyne.

PTS: 1