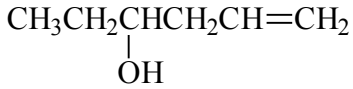
Organic Chemistry 32-235
Practice Exam #4

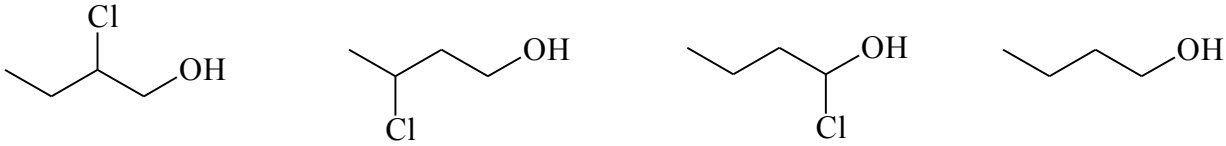
Part 1:

1. The correct IUPAC name for the following structure is.



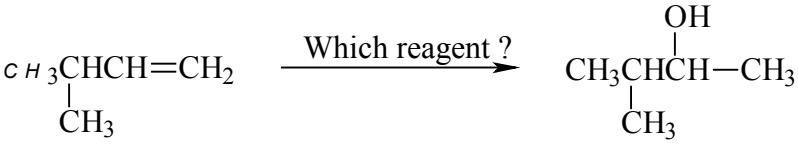
(A) 5-hexen-3-ol
(B) 1-hexen-4-ol
(C) 3-hydroxy-5-hexene
(D) Isohexen-3-ol
(E) 4-hydroxy-1-hexene

2. Which of the following alcoholic proton (O**H**) is expected to be the most acidic?



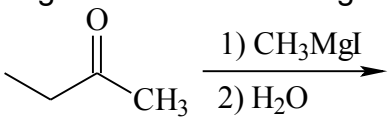
(A) (B) (C) (D)

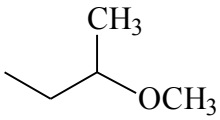
3. Which is the best reaction sequence to use if one wants to accomplish an alcohol synthesis shown below?

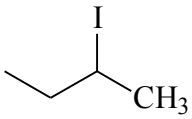


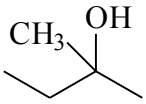
(A) $NaOH/H_2O$
(B) $KMnO_4/H_2O$
(C) i) $Hg(OAc)_2/H_2O$; ii) $NaBH_4$
(D) i) BH_3; ii)H_2O_2/HO^-
(E) none of the above

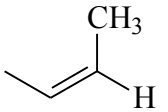
4. The following transformation using a Grignard reagent will yield:

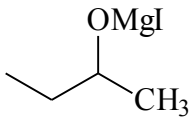


(A)


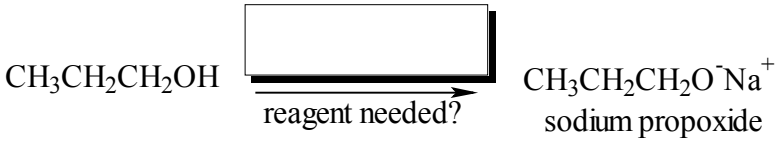
(B)


(C)


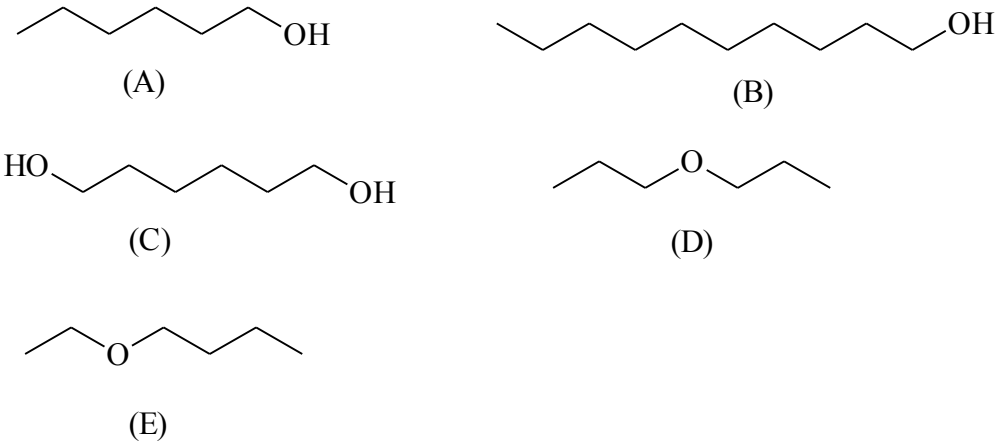
(D)


(E)


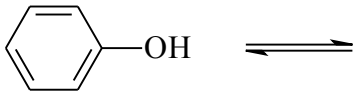
5. Alkoxides are useful reagents in organic synthesis. Complete the following alkoxide formation by providing an appropriate reagent.



6. Which of the following compounds is expected to have the greatest solubility in water?

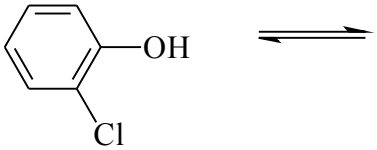


7. Which of the following acid-base reactions is expected to favor the reactant side (left side)?

(A) $CH_3CH_2O^-Na^+$ + 

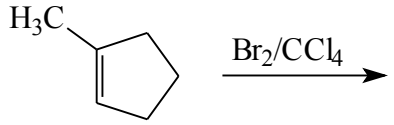
(B) $CH_3CH_2SH + (CH_3)_2CHO^-Na^+$ $\rightleftharpoons$

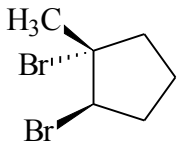
(C) $(CH_3)_2CH\overset{O}{\overset{\|}{C}}O^-Na^+ + H_2O$ $\rightleftharpoons$

(D) NaOH + 

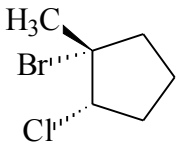
(E) They all favor the right side

8. Which product is expected from the following reaction?

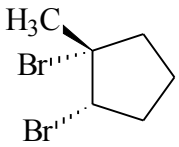




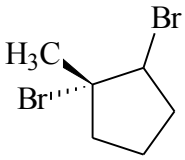
(A)



(B)

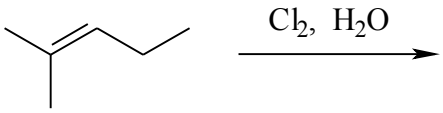


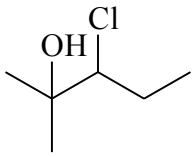
(C)



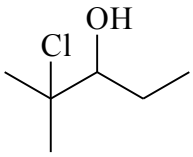
(D)

9. Predict the major organic product expected from the following reaction:

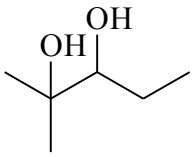




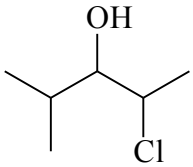
(A)



(B)

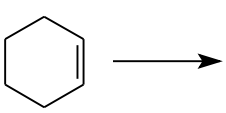


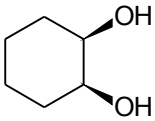
(C)

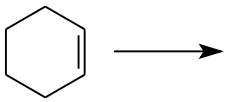


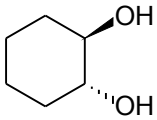
(D)

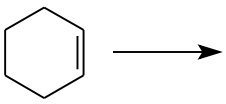
10. Which reagent would allow the formation of each desired product?

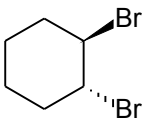






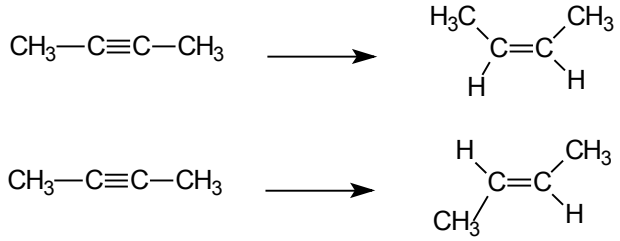






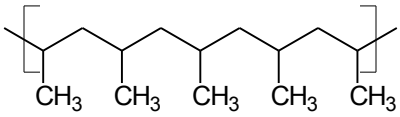
1) H_2O, NaOH
2) $KMnO_4$/NaOH
3) OsO_4/H_2O_2
4) O_3, then $(CH_3)_2S$
5) H_2O, H_2SO_4
6) i) CH_3CO_2OH, then ii) H_3O^+
7) 2 HBr
8) Br_2
9) Br_2/H_2O

11.

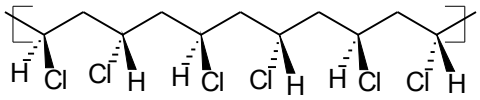


1) H_2/Pt
2) H_2O, H^+
3) H_2/Pd/Quinoline
4) Na/NH_3(liq)
5) i) HCl, ii) H_2/Pt, iii) $NaOCH_3$

12. Which monomer can be used to prepare the following polymer:



13. What type of tacticity does the following PVC polymer have?



End of Part 1

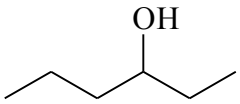
Part 2:

1. Explain why ethylene glycol is a good coolant in the summer for our cars, while water alone is not. (explain from the chemistry point of view)

1A. Explain why a cycloheptene (very unstable thougth) can be made but cycloheptyne has never been made.

2. Explain why the H's in ethyne are considerably more acidic than those in ethane. Illustrate your point with chemical equations.

3. Starting from organic compounds with 4 or less carbons and any other inorganic reagents, synthesize the following molecule. Indicate clearly what reagents are needed in each step. (Hint: try retrosynthetic analysis)



4. Show how you would synthesize the following compound, beginning with acetylene and any other necessary reagents.