

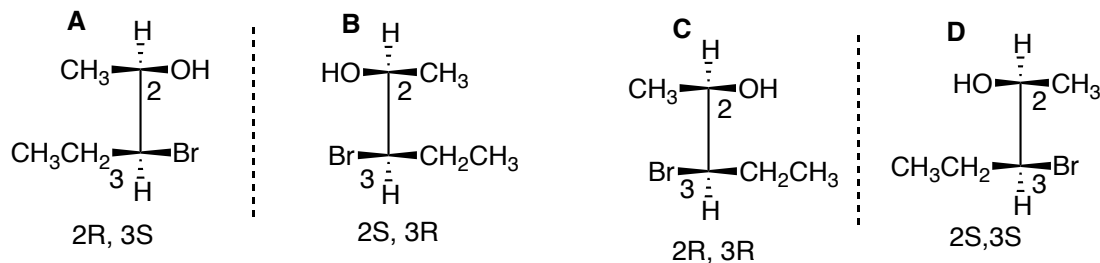
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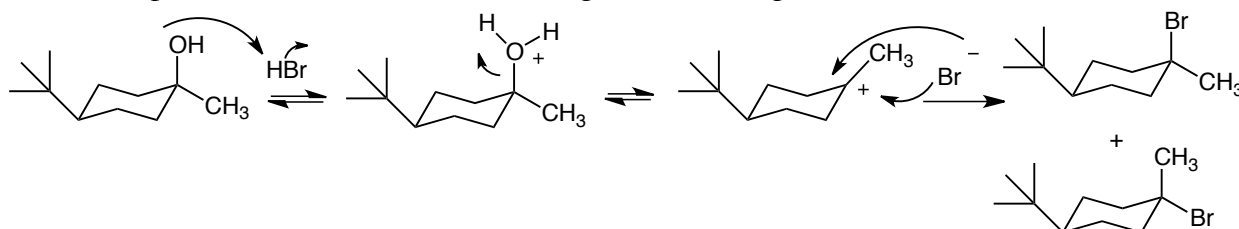
Chem. 121, Sect 008, Quiz 3

Fall, 2011, 50 points

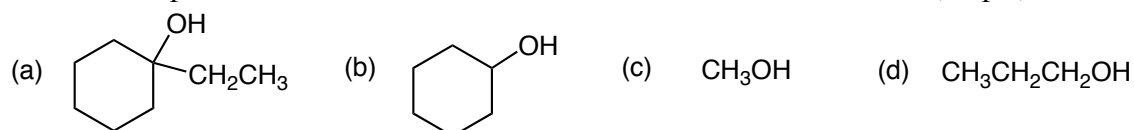
1. Find all stereoisomers of 2-bromo-3-pentanol and assign the absolute configuration (R or S) to each chirality center. Be sure to number the carbons. (15 pts)



2. Give the product(s) formed in the following reaction. (10 pts)



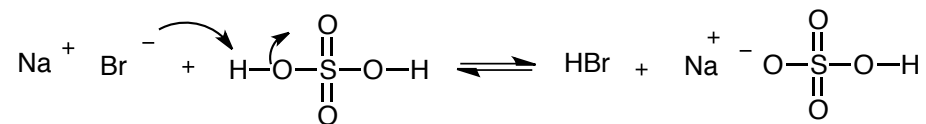
3. An unknown alcohol did not react with chromic acid (H_2CrO_4) or potassium permanganate (KMnO_4) or with KI/I_2 but did react immediately with ZnCl_2/HCl . Which alcohol best fits these results? For partial credit, indicate the results of the each the reactions. (10 pts)



Immediate reaction with ZnCl_2/HCl indicates a tertiary alcohol, 1-ethylcyclohexanol (a) since there is a carbocation involved. A negative reaction with KI/I_2 indicates that it is not a secondary methyl alcohol.

4. In the preparation of 1-bromobutane from 1-butanol, aqueous sulfuric acid and sodium bromide (a) a dangerous gas is also produced. What is it and how is it formed? (Show the reaction.) (b) How do we prevent it from escaping into the lab? (c) The stockroom ran out of sulfuric acid. The teaching assistant recommended that the students use aqueous hydrochloric acid instead. Would the reaction still work? Explain your answer. (d) Would there be more than one product? Explain and if yes show the other product(s).

(a) The dangerous gas that is produced is HBr . It is formed from the reaction of NaBr and H_2SO_4 .



(b) We trap it in a water bath using our long stemmed funnel connected to the reaction flask at the top of the condensing column by a rubber tube.

(c) and (d) The reaction would work. HCl ($\text{H}_3\text{O}^+\text{Cl}^-$) is a strong enough acid to protonate the alcohol to make it into a good leaving group but there would be two products formed, since there are two nucleophiles available, Cl^- and Br^- .

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