## **Organic Reactions Practice**

Write an equation for each of the following reactions. Use molecular and structural formulas and classify the reaction as combustion, addition, substitution, hydrogenation, or hydration.

- (a) Octane burns with oxygen gas.  $C_g H_{18} + O_3 \rightarrow CO_2 + H_3 O$
- (b) 2-methyl-1-pentene reacts with hydrogen.  $(-1) = (-1) + \frac{1}{2} + \frac{1}$
- (c) Ethyne (Acetylene) and oxygen react.  $\angle = C + O_2 \Rightarrow CO_2 + H_2O_2$
- (d) 3-methyl-1-butyne reacts with excess hydrogen. C= C- + スル → C-C
- (e) Chlorine reacts with ethane.  $C-C+C|_2 \rightarrow C-C+H|_2$
- (g) Bromine combines with benzene.  $\bigcirc$  +  $\beta \Gamma$   $\rightarrow$   $\bigcirc$   $^{\beta \Gamma}$  +  $\mathcal{H}\beta \Gamma$
- (h) Propene and HBr combine.  $C = C C + HBC \rightarrow C C C$
- (i) Cyclohexene reacts with hydrogen gas. () + )
- (j) Acetylene reacts with excess hydrogen chloride.  $C = C + 2HCI \rightarrow C = C + 2HCI$
- 1. Propane reacts with fluorine.  $(-(-) + F_5 \rightarrow C (-) + F_F F)$
- 2. Chloroethane reacts with dilute hydroxide ions.  $(-(+0))^{-1}$
- 3. Ethanol, present in gasohol, burns in an automobile engine. C-C-OH+O  $\rightarrow$   $CO_T+H_TO$
- 4. 1-butanol reacts in the presence of concentrated sulfuric acid. 4.0 + 6.0
- 6. Bromine and ethene react to form an alkyl halide.  $= + \beta_1 \rightarrow -$
- 7. Hydrogen chloride and propene react to produce an alkyl halide. (=(-(+))

Write an equation using structural diagrams to show the production of each of the following alcohols from an

- appropriate alkene:

  a. 2-butanol |-butene + H<sub>2</sub>O
- b. 2-methyl-2-propanol

Is the product an aldehyde or a ketone?

- (a) 2-pentanol C-C-G-C kctone
- (b) 1-hexanol C-C-C-C-C=0 aldchyde

Name the following esters, and the acids and alcohols from which they could be prepared.

- (a) CH3CH2COOCH2CH3 ethanol + propanoic acid
- (b) CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>COOCH<sub>3</sub>

methanul + butancic acid

For each, write a structural formula and an equation or a series of equations for a method of synthesis from the suggested reactants.

Oxidize x 2 synthesis of a carboxylic acid from the controlled oxidation of 1-propanol N-methyl ethanamide from methane, ethanol, and inorganic compounds of your choice. Meth Hulle -> meth amin others = otheral > ethanoic acid 2-pentyl butanoate from 1-pentene and butanal Butyl 2-methylpropanoate from 1-butanol and an appropriate alcohol 2 methyl propanal 4-heptanone from an alcohol 4-heptanol ethyl ethanoate from ethane  $\rightarrow +(1, \rightarrow 0 \rightarrow 6) \rightarrow 6)$ pentyl ethanoate from ethene and an alcohol  $\rightarrow H_2O \rightarrow [O]$  Propyl ethanoate from an alkene and an alcohol  $\rightarrow H_2O \rightarrow [O]$   $\rightarrow [O]$   $\rightarrow [O]$   $\rightarrow [O]$   $\rightarrow [O]$   $\rightarrow [O]$  3-octanone from a simpler compound methyl benzoate from two alcohols

methanol phenol > [0] sodium salt of butanoic acid from an ester butanoate the salt with NaOH trimethylamine from ammonia and alkanes anes  $\Rightarrow$  methane  $+I_3 \rightarrow C-I$   $\downarrow NH_3 \rightarrow NH_2 CH_3$ sethane of Cla of God of Cold of Cold of Cold of Cla of Cla of Cold of N-ethylethanamide from an alkane and ammonia addition + H, + HX substitution alcohols alkanes alkyl halides + X, +NH<sub>3</sub> 1º alcohol 2º alcohol dehydration (H,SO<sub>4</sub>)  $(O)^*$ amines aldehvdes ketones ethers (O)\* \*(O) indicates controlled oxidation with KMnO4 or carboxylic acids Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup>, in H<sub>2</sub>SO<sub>4</sub> amine alcohol

condensation

esters

amides