Answer key

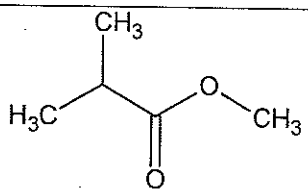
Predict the products

1. 2-hexene + F_2 → 2,3-difluorohexane

2. 3-heptene + H_2O $\xrightarrow{\text{acid}}$ 2-heptanol, 3-heptanol

3. 3-hexanol $\xrightarrow{H_2SO_4}$ 3-hexene

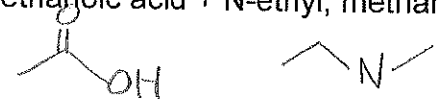
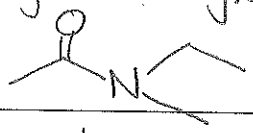
4. propane + Cl—Cl $\xrightarrow{h\nu}$ chloropropane

5.  + H—OH $\xrightarrow{\text{NaOH}}$

6. HCl + 3-pentene → 2-chloropentane, 3-chloropentane

7. 2-hexanol + $Cr_2O_7^-$ $\xrightarrow{\text{acid}}$ 2-hexanone

8. ethanoic acid + N-ethyl, methanamine → N-ethyl-N-methylethylamide + water

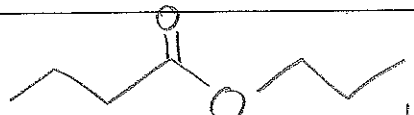
9. 1-pentanol + $Cr_2O_7^-$ $\xrightarrow[\text{heat under reflux}]{\text{acid}}$ pentanoic acid

10. H_2 + 1-butene → butane

11. 1-octanol + $Cr_2O_7^-$ $\xrightarrow[\text{distill}]{\text{acid}}$ octanal

12. heptane + O_2 → carbon dioxide + water

13. Incomplete combustion of propane carbon monoxide

14. propanol + butanoic acid $\xrightarrow[\Delta]{H_2SO_4}$  + water

propyl butanoate

15. $H_2C=CH_2 + O_2$ → carbon dioxide + water

16. Which of the above are addition reactions? 1, 2, 6, 10

17. Which of the above are condensation reactions? 8, 14

18. Give specific industrial uses of the following reactions:

a. Hydration production of alcohols

b. Addition of H2 - make veg. oil solid (margarine)

c. Condensation of alcohol and carboxylic acid - form esters - artificial flavourings - solvents

19. List 4 uses of esters

- perfume
- artificial flavours
- polyesters → plastics

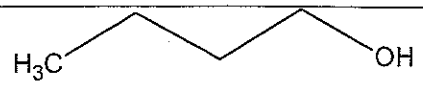
20. Describe a test that can be done to identify the presence of

a. An alkene

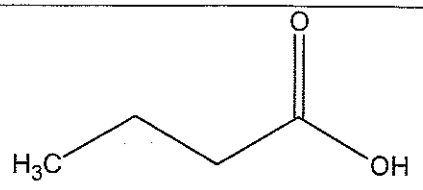
- add Br_2 if colour disappears, it is an alkene

b. An Alcohol

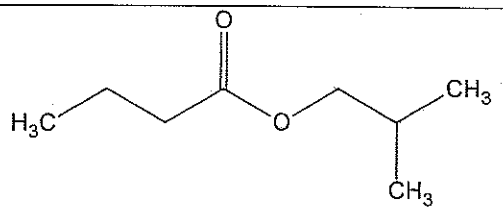
Retrosynthetic analysis: Give the reactants that could be used to make the following

1. 

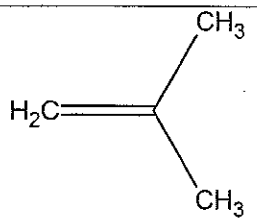
1-bromobutane + NaOH

2. 

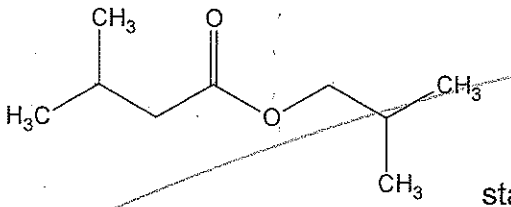
1-butanol + $K_2Cr_2O_7$ $\xrightarrow[\Delta]{acid}$

3. 

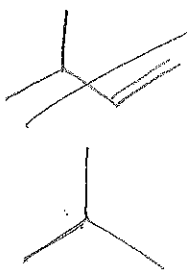
butanoic acid + 2-methyl-1-propanol in acidic solution + heat

4. 

1-bromo-2-methylpropane + NaOH $\xrightarrow{\Delta}$

5. Describe (giving specific reactions and the conditions under which the reactions would occur) how you could make 

starting with alkenes.



requires preparation of non-Markovnikov product → not required