Table I
Heats of Reaction at 101.3 kPa and 298 K

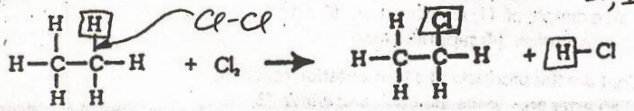
ORGANIC COMPD	Reaction	ΔH (kJ)*
	$CH_4(g) + 2O_2(g) \longrightarrow CO_2(g) + 2H_2O(\ell)$	−890.4
	$C_3H_8(g) + 5O_2(g) \longrightarrow 3CO_2(g) + 4H_2O(\ell)$	−2219.2
	$2C_8H_{18}(\ell) + 25O_2(g) \longrightarrow 16CO_2(g) + 18H_2O(\ell)$	−10943
	$2CH_3OH(\ell) + 3O_2(g) \longrightarrow 2CO_2(g) + 4H_2O(\ell)$	−1452

#1) **Combustion**

only Alkanes

Alkenes & Alkynes

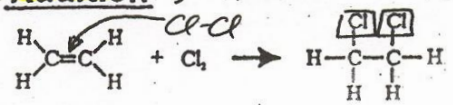
#2) **Substitution** of [H] with HALOGEN ← F, Cl, Br, I



$C_2H_6 + Cl_2 \rightarrow C_2H_5Cl + HCl$

2 products

#3) **Addition** of HALOGEN or HYDROGEN



$C_2H_4 + Cl_2 \rightarrow C_2H_4Cl_2$

1 product

#4) **Fermentation** of sugar by yeast

$C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$

glucose → ethanol + carbon dioxide

"making booze"

#5) **Esterification** – making an ester by DEHYDRATION synthesis

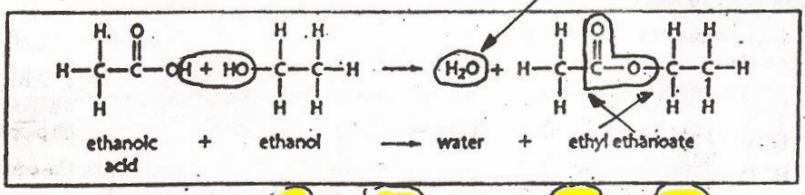


Figure 11-16. Esterification: An acid and an alcohol react to produce water and an ester.

$CH_3COOH + HOC_2H_5 \quad H_2O + CH_3COOC_2H_5$

#6) **Saponification** – making soap from fat

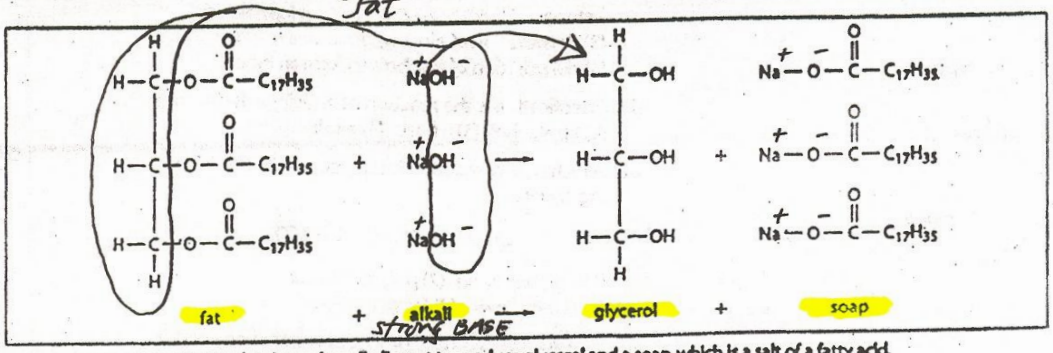
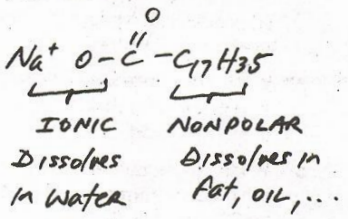
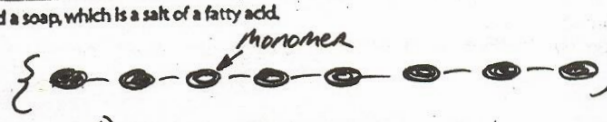


Figure 11-17. Saponification: A fat and an alkali react to produce glycerol and a soap, which is a salt of a fatty acid.

How does soap work?



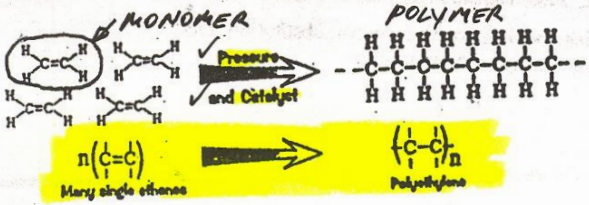
#7) **Polymerization** – making a polymer

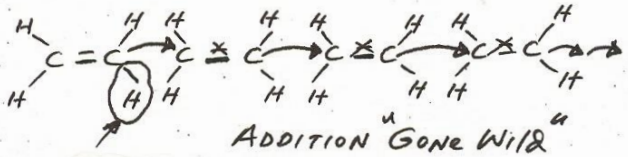


= polymer – a very long chain of monomers

A) How are the monomers linked?

ADDITION POLYMERIZATION – by breaking Db or Triple Bond



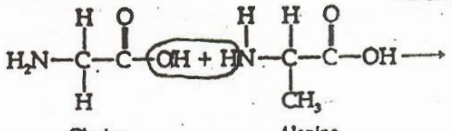


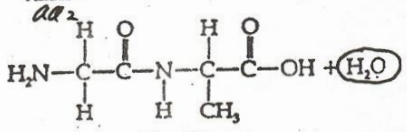
ADDITION "Gone Wild"

ex) Plastics, Rubbers

P.V.C Polystyrene

B) **CONDENSATION POLYMERIZATION** – by Dehydration synthesis "Gone Wild"





And so on,

$aa_1 - aa_2 - aa_3 - aa_4 - aa_5 \ldots$

Proteins (Polypeptides)

Also, Cotton, Polyester

Also,

Glu – Glu – Glu – Glu ...

Carbohydrates (Polysaccharides) — Starch, Cellulose