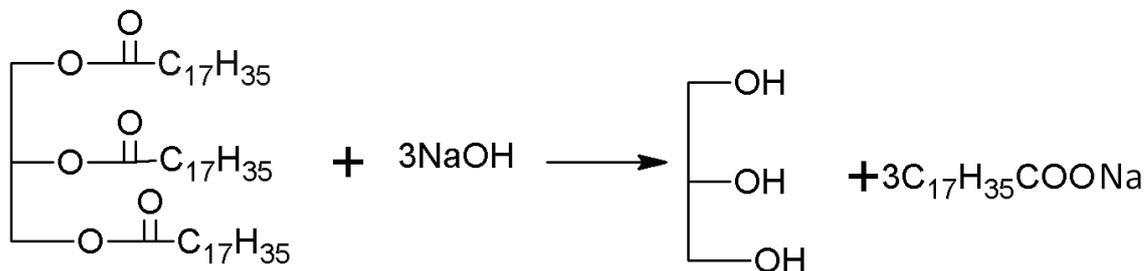If 10.0g of triglyceride reacts with 50.0mL of 6.0 M NaOH, what's the theoretical yield of soap?

Solution:

Firstly, we determine the molar mass of reactants and products:
the molar mass of triglyceride $M(C_3H_5(C_{17}H_{35}COO)_3)$=890 g/mol;
the molar mass of soap $M(C_{17}H_{35}COONa)$=306g/mol.
After that we calculate a limit quantity of reactants:

a quantity of triglyceride $\dfrac{10.0}{890.}=0.011\,mole,$

a quantity of NaOH $6.0 \cdot 0.05 = 0.3\,mole.$

So, the quantity of triglyceride is limited.
We calculate the theoretical yield of soap for the quantity moles of triglyceride. From the equation of reaction one mole of triglyceride produce three moles of soap. So, the theoretical yield of aspirin is: 0.011·3·306=10.01 g.

Answer:
The theoretical yield of soap is 10.01 g.