TAX BENEFITS FROM CHARITABLE CONTRIBUTIONS

We assume that a company earns $100,000. It wants to contribute 10% to charity after paying state and federal taxes. We assume that the state taxes are 5% after charitable contributions are deducted and the federal taxes are 40% after charitable contributions and state taxes are deducted. What are the charitable contributions, state taxes, and federal taxes?

Let $C$ be the amount of charitable contributions, $S$ the state taxes, and $F$ the federal taxes. The equations that must be satisfied in terms of $1,000 of dollars are

\[
C = 0.1 (100 - S - F),
\]
\[
S = 0.05 (100 - C),
\]
\[
F = 0.4 (100 - C - S)
\]

or

\[
10 = C + 0.1 S + 0.1 F,
\]
\[
5 = 0.05 C + S,
\]
\[
40 = 0.4 C + 0.4 S + F.
\]

These can be solved which yields $C = 5,956$, $S = 4,702$, and $F = 35,737$, or $5,956$ in charitable contributions, $4,702$ in state taxes, and $35,737$ in federal taxes.