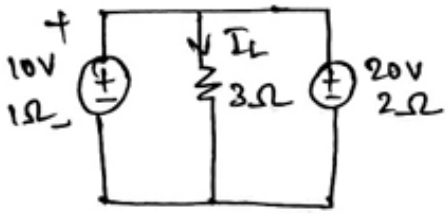
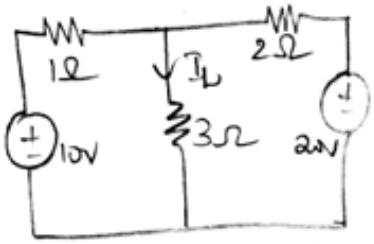
Superposition Theorem:

Superposition theorem states that "In a linear circuit consisting of more than one independent source, the total current in any part of the circuit equals the algebraic sum of the individual contribution of currents produced by each independent source separately".

Problem:

Using superposition theorem, find the current through the 3Ω resistor in the circuit shown

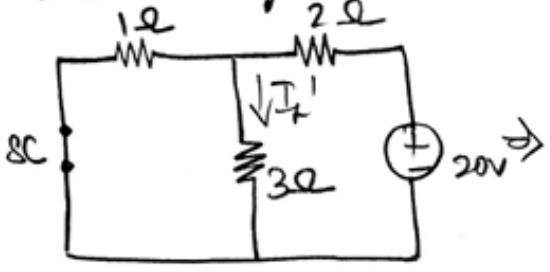




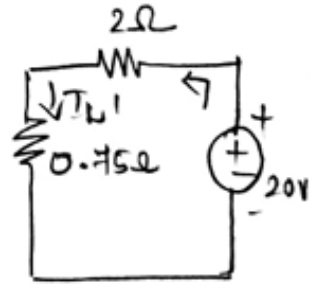
S.C ⇒ voltage source

O.C ⇒ Current source

First S.C 10V voltage source

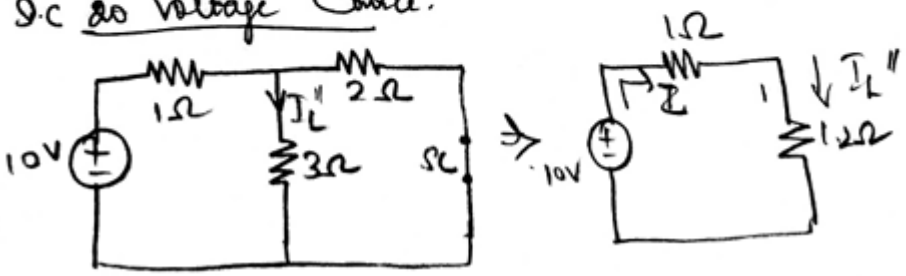


⇒



$I_L' = 7.3 \times \frac{1}{1+3} \Rightarrow 1.825A$ $\Leftarrow$ $I = \frac{V}{R} = \frac{20}{0.75+2} = 7.3A$

D.C 20 voltage Source:



$I = \frac{V}{R} = \frac{10}{1+1.2} = 4.55A$

$I_L'' = 4.55 \times \frac{2}{2+3} = 1.82A$

By superposition theorem,

$I_L = I_L' + I_L''$

$\Rightarrow 1.825 + 1.82 = 3.645A$