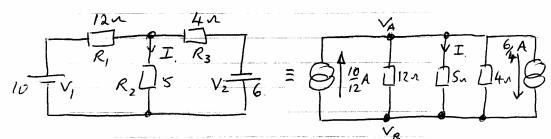


Q2 Convert V, +R, and V2+R3 from a Thenenin form to a Norten form ....



need to find the voltage VA-VB ....

$$V_A - V_B = \left(\frac{10-6}{12} - \frac{6}{4}\right) \cdot \frac{15}{8} = -\frac{8}{12} \cdot \frac{15}{8} = -\frac{5}{4} \sqrt{\frac{15}{4}}$$

$$I = -\frac{5}{4} /_5 = -\frac{1}{4} A = \frac{-0.25A}{-0.25A}.$$

93. Try replacing the Norton circuits Ri+ I, and Rz and Iz by Thenenin equivalents and see

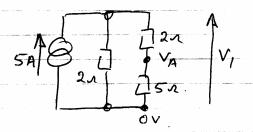
where you end up.

94 The gnestion tells you how to proceed. What is  $I_{2n}$  if  $V_R = 0$ ?

Q5 (a) Work out Va-VB (or simply Va if you have remembered to make VB your zero reference).

Probably correct to use superposition for this - the 10v is easy but I is a bit tricky

Va due to I



 $V_1 = 5A \times 2\pi / (2n + 5n)$   $V_{74} = 15.6 V$ and  $V_A = V_1 \times \frac{5\pi}{2n + 5\pi}$   $R_{74} = 2.22\pi$  $T_{AB} = 3.68 A$ 

(b) Nothing tricky in this one. The 9V source is easily dealt with once the voltage across the 3r resister due to 7.7A and 11V is found. Again, superposition is probably the best method....
Remembering that VB is the zero reference,

 $V_{3n}$  due to 7.7A = -9.63V $V_{3n}$  due to 1/V = -2.75V

: V3n tot = -12.4.

..  $V_A = -12.4 - 9 = -\frac{21.4}{21.4}$   $R_{TH} = 3x / (4x + 5x) = 2.25x$  by inspection (remember  $R_{TH}$  is the resistence looking into AB with all current sources replaced by

open circuits and all voltage somes replaced by short circuits.)

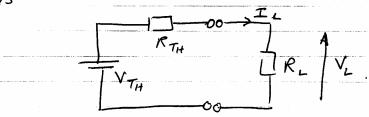
So Ins through In Newster =  $\frac{-21.4}{2n + 2.25n}$ = -5.04A

- (c) This one is easy but you need to be careful in your choice of reference. I would choose the common bottom line and work out VA + VB with respect to this before working out VA-VB, which equals VTH.
- Q6(a) 5v, 10v and 4v form a petential divider that can be represented as a Thevenin equivalent. The Norten circuit consisting of IA, 6v and 4v can be converted into a Thevenin equivalent. This leaves a simple senes circuit
  - (b) convert 12v + 6x mto a Norten equivalent and do the same with 6v + 4vr. This gives you a purallel circuit. You can either work from the parallel circuit or you can combine the Nortens who one and convert to a Therenin.
    - (c) convert the 2A and 5x into a Therenin and then the Thevenin consisting of this and the love back into a Nortan. The current of this Nortan can be added to the 4A (using the correct signs, of course) and the resulting Norton converted to a Therenin. You now have a simple series circuit.

      The only tricky bit here is that you

need to recognise that the 3r in senses in the the 4A has no effect at all on I - the current through the 3r - 4A combination is always 4A and the voltage across it is set by the rest of the circuit.

97 This is a furty standard way of measuring internal resistance - there are others. The model you are trying to find value; for



SO V\_ = - ILRTH + VTH

which is equivalent to

y = mx + c

M = - RTH = slope of straight line VTH = value of V at which extension of line cuts the y (voltage) axis

The incorrectly measured point will not live on the line