Q1

# Quiz-2

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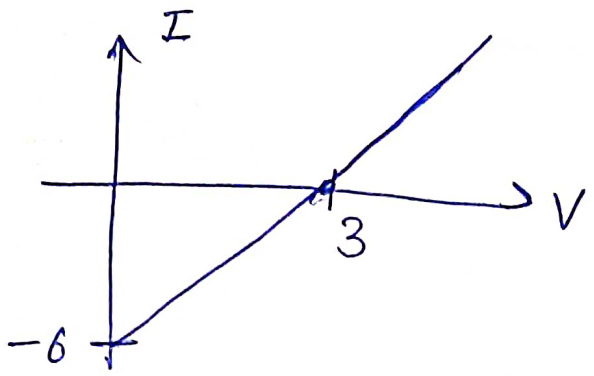
SEC A
ECE 113
Basic Elec




When voltage = 3V ⇒ current = 0

and when voltage = 0, curr = −6A

Current thro' the load is ~~actually~~ $I_L$

When we are finding $V_{Th}$, we Short the load and at that time $I_L = 0$ so $\boxed{V_{Th} = 3V}$

When we short the load, we are finding $I_N$ and at that time, voltage across load becomes 0.

So $\boxed{I_N = 6A}$

$R_N$, Norton resistance $= \frac{V_{Th}}{I_n} = \frac{3}{6} = 0.5\Omega$

Q2

I. For charging,

$V_S = 40\,V \quad R = 5K\Omega \quad C = 10\mu F$

Voltage attained after $\infty$ time $\Rightarrow 40V$

Now switch is moved so discharging

$v_c = V_0 e^{-t/RC} \qquad RC = 10 \times 10^{-6} \times 2 \times 10^{3}$

$\Rightarrow 20 \times 10^{-3}$

$v_c$ across R at $t = 2 \times 10^{-3}\,s$

$$v = 40 \times e^{-\frac{2 \times 10^{-3}}{20 \times 10^{-3}}}$$

$$40 \times e^{-\frac{1}{10}} = 36.193$$

$$I = \frac{36.193}{2 \times 10^{3}} \neq 10\,mA \quad \text{False}$$

II. $200\,V = V_S \qquad R = 10\Omega \qquad L = 0.1H$

Current at $0.01\,s$

$$\tau = \frac{L}{R} = \frac{0.1}{10} = 0.01$$

So at $t = \tau$, current = 63.2% of initial current $I_0$, so current is not zero. So the statement is false

III Transient or disturbance is produced in the circuit when we move from one steady state to another. So this may happen when we short a circuit / change applied voltage/current source, suddenly connect / disconnect from source. So there are a lot of reasons and not just changing applied source. Hence FALSE

continued after 2.4

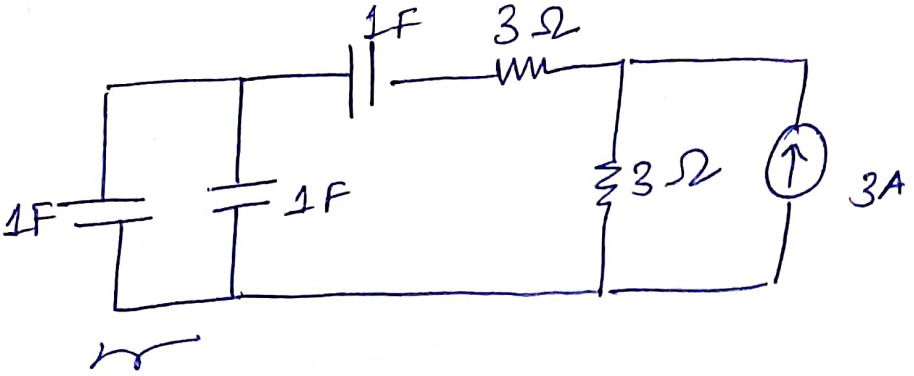
IV. False

There are no transients in a circuit consisting of only resistance because they donot store energy unlike capacitor / resistor. They just dissipate power.

It can also happen due to faults in power system, sudden load changes, etc.

This statement is false because of the usage of the word ONLY.

V.



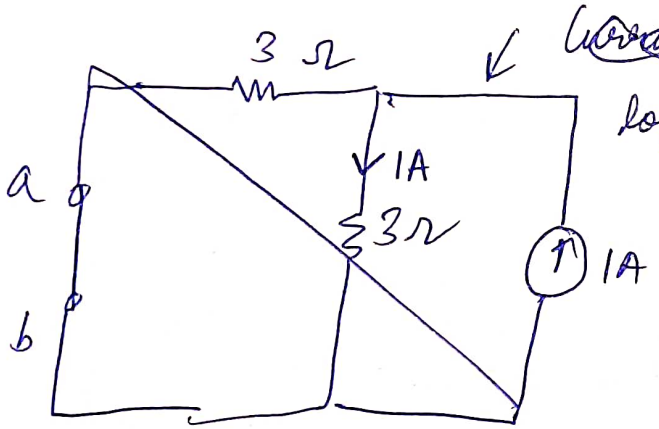

Solve in parallel

Using formula $C_p = C_1 + C_2 \Rightarrow 2F$

Then in series w/ 1F capacitor so

$$C_{eq} = \frac{2 \times 1}{2+1} = \frac{2}{3} F \quad \left( C_S = \frac{C_1 C_2}{C_1 + C_2} \right)$$

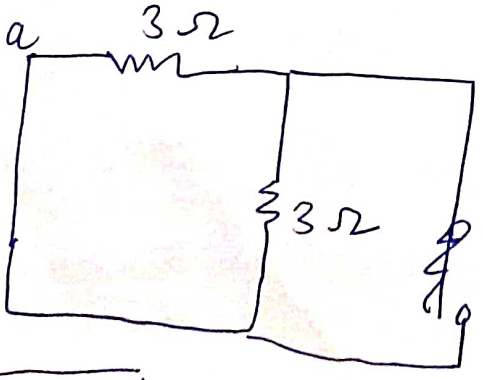
Now for finding $R_{eq}$, we find $R_{Th}$




~~Current flows only this loop as rest are open~~

Short capacitor and find $R_{Th}$ and open current source

~~So $V_{AB}$ = Voltage across 3Ω ⇒ 3V~~




$R_{Th} = 6\Omega$

as 3Ω series 3Ω

So time constant

$R_{eq} C_{eq} \Rightarrow 6 \times \frac{2}{3} = 4s$

TRUE