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2019W1_ELEC_201_101102
Assignment ASN4 due 10/09/2019 at 04:59pm PDT

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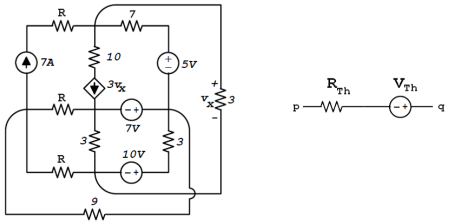
1. (12 points)

(a) In the figure, R = 17 Ω. Find, V_{th} and R_{th}, for the Thevenin equivalent seen by the 9 Ω resistor at the bottom, as per the figure below the circuit.

V_{th} = ___ V

R_{th} = ___ Ω

Figure:



(b) Replace the 9 Ω resistor for a resistance that will drain maximum power off the circuit. What is the value of that resistance, R_X in ohms, and of that P_{MAX} in watts.

R_X = ___ Ω

P_{MAX} = ___ W

Correct Answers:

- 69.0814
- 8.85222
- 8.85222
- 134.775

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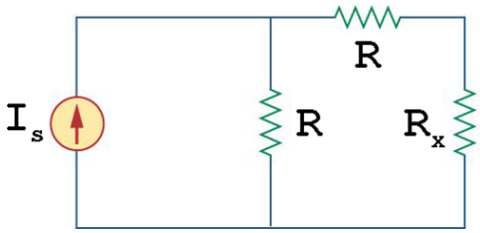
2. (12 points)

What is V_{th} and R_{th} 'seen' by R_x when I_s = 20 A, R = 17 Ω and R_x = 5 Ω. Determine this, by simple observation, do not use calculator, nor pen or paper.

Figure:



V_{th} = ___ V

R_{th} = ___ Ω

Correct Answers:

- 340
- 34

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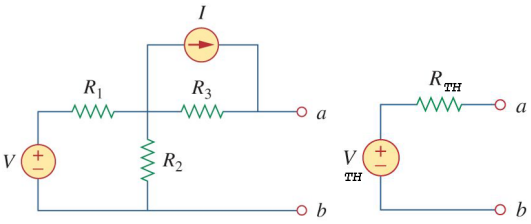
3. (12 points)

At the port 'ab' find the V_{oc}, in volts, the open circuit voltage; and also find I_{sc}, the shortcircuit current, in amps. And determine V_{TH} and R_{TH} for its Thevenin equivalent circuit, as per the figure below. R_1 is 27, R_2 is 17, $R_3$is 29 all in ohms. V is 7 volts, and I is 20 amps.

Figure:



V_{th} = ___ V

R_{th} = ___ Ω

V_{oc} = ___ V

I_{sc} = ___ A

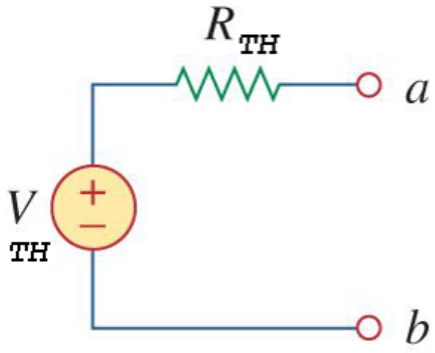
Correct Answers:

- 582.705
- 39.4318
- 582.705
- 14.7775

4. (12 points)

For the circuit shown, what are the open circuit voltage, V_{oc}, and the short circuit current, Isc. V_{TH} is 29 volts, and R_{TH} is 41 ohms.

Figure:



V_{oc} = ___ V

I_{sc} = ___ A

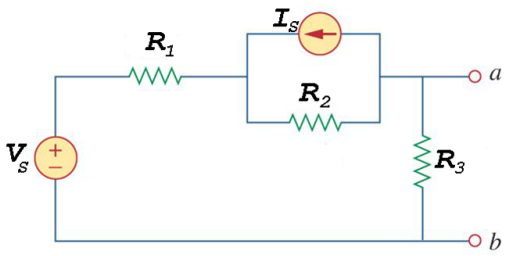
Correct Answers:

- 29
- 0.707317

5. (13 points)

The values of the elements in the circuit shown are: V_s is 9 volts, I_s is 29 amps, R_1 is 8 Ω, R_2 is 38 Ω and R_3 is 14 Ω. Find the open circuit voltage and the short circuit current at the port ab and then report the Norton equivalent parameters I_N and R_N.

Figure:



I_{SC} = ___ A

V_{OC} = ___ V

I_N = ___ A

R_N = ___ Ω

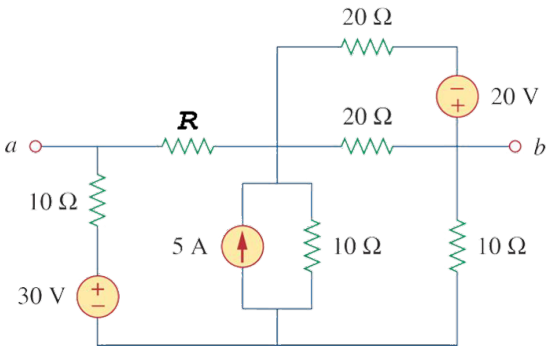
Correct Answers:

- -23.7609
- -255.033
- -23.7609
- 10.7333

6. (13 points)

When a 4 A current source is connected from **(b) to (a)**, the voltage that appears across it is $V_{ab} = 59.6\ V$. If you replace the current source by another with 18 A, the voltage becomes 233.2 V. Find the Thevenin V_{th} and R_{th}. After that, determine the value of the resistor R in ohms.

Figure:



V_{th} = ___ V

R_{th} = ___ Ω

R = ___ Ω

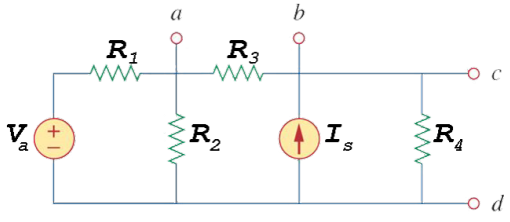
Correct Answers:

- 10
- 12.4
- 25

7. (13 points)

For the circuit in the figure, all resistors are in ohms as follows. R_1= 15, R_2= 14Ω, R_3= 16Ω, R_4 = 7Ω. The values of the sources are V_a= 5 volts and I_s= 6 amps. Find the Norton equivalent at port ab and also at port cd R_{Nab}, I_{ab}, R_{Ncd}, I_{cd}.

Figure:



R_{Nab} = ____ Ω

R_{Ncd} = ____ Ω

I_{ab} = ____ A

I_{cd} = ____ A

Correct Answers:

- 7.53478
- 5.3797
- -2.77966
- 6.10386

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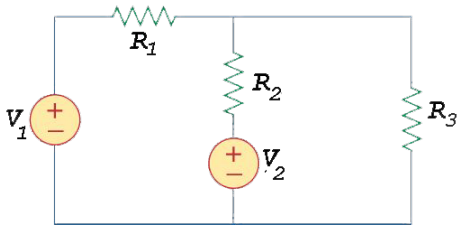
8. (13 points)

The resistor R_2 = 4.44444 ohms is absorbing the maximum power that can be extracted out of the rest of the circuit. What is the value of the resistor R_1, in ohms, and what is the mentioned maximum power in R_2, in watts. R_3 = 8 ohms, V_1 = 6 volts, V_2 = 6 volts.

Figure:



R_1 = ____ Ω

$P_{\max}$ = ____ W

Correct Answers:

- 10
- 0.625