X

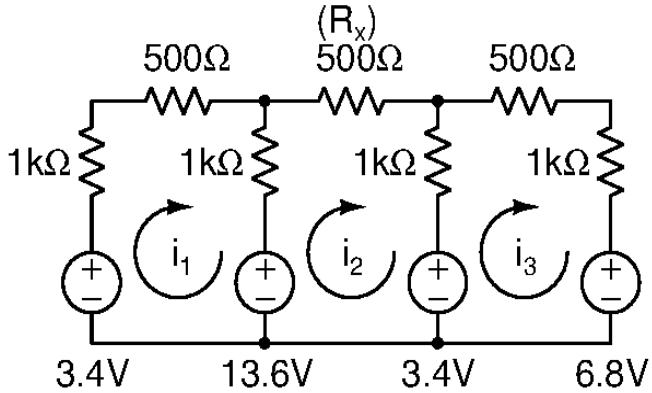
Unit 7 - Week 5 : Mesh analysis; Circuit theorems

Assignment 5

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-10-21, 23:59 IST.

1)



Setup the mesh analysis equations for the circuit above with the given source vector. The format of the equations is as shown.

$$\begin{bmatrix} R_{11} & R_{12} & R_{13} \\ R_{21} & R_{22} & R_{23} \\ R_{31} & R_{32} & R_{33} \end{bmatrix} \begin{bmatrix} i_1 \\ i_2 \\ i_3 \end{bmatrix} = \begin{bmatrix} -10.2 \\ 10.2 \\ -3.4 \end{bmatrix}$$

R_{ij}'s are the numerical values in $\mathbf{kilohms}(k\Omega)$, and the values in the source vector are in $\mathbf{volts}(V)$.

You have to evaluate the expression given below using the values from these matrices.

Find the value of the expression:

$$R_{11} \times R_{12} + R_{22} \times R_{23} + R_{31} \times R_{32}$$

(Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) -5.5,-4.5

1 point

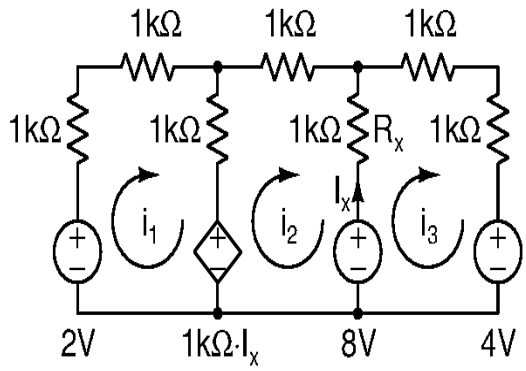
2) Determine the power dissipated in the resistor R_x in the circuit above.

(The answer must be in **milliwatts (mW)**. Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 3.8,4

1 point

3)



Setup the mesh analysis equations for the circuit above with the given source vector. The format of the equations is as shown.

$$\begin{bmatrix} R_{11} & R_{12} & R_{13} \\ R_{21} & R_{22} & R_{23} \\ R_{31} & R_{32} & R_{33} \end{bmatrix} \begin{bmatrix} i_1 \\ i_2 \\ i_3 \end{bmatrix} = \begin{bmatrix} 2 \\ -8 \\ 4 \end{bmatrix}$$

R_{ij}'s are the numerical values in **kilohms** $(k\Omega)$, and the values in the source vector are in **volts** (V).

You have to evaluate the expression given below using the values from these matrices.

Find the value of the expression:

$$R_{11} \times R_{12} + R_{22} \times R_{23} + R_{31} \times R_{32}$$

(Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) -14.5,-13.5

1 point

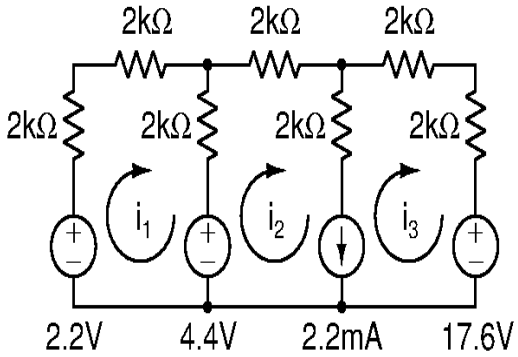
4) Determine I_x in the circuit above.

(The answer must be in **milliamperes (mA)**. Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 2.4,2.7

1 point

5)



Setup the mesh analysis equations for the circuit above with the given source vector. The format of the equations is as shown.

$$\begin{matrix}\text{Mesh} \\ \text{Supermesh} \\ \text{Current source}\end{matrix}\begin{bmatrix} R_{11} & R_{12} & R_{13} \\ R_{21} & R_{22} & R_{23} \\ a & b & c \end{bmatrix}\begin{bmatrix} i_1 \\ i_2 \\ i_3 \end{bmatrix} = \begin{bmatrix} -2.2\,V \\ -13.2\,V \\ 2.2\,mA \end{bmatrix}$$

R_{ij}'s are the numerical values in **kilohms**$(k\Omega)$. a, b, c are scalars.

You have to evaluate the expression given below using the values from these matrices.

Find the value of the expression:

$$R_{11} \times R_{12} + R_{22} \times R_{23} + b \times c$$

(Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 2.9,3.1

1 point

6) Determine the power *delivered* by the current source in the circuit above.

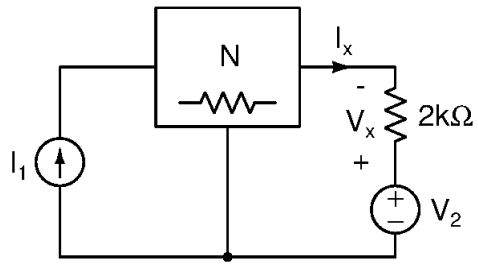
(The answer must be in **milliwatts (mW)**. Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) -3.6,-3.4

1 point

7)



In the circuit above, $I_x = 0.5\,\text{mA}$ when $I_1 = 4\,\text{mA}$, $V_2 = 4\,\text{V}$ and $V_x = 1\,\text{V}$ when $I_1 = 2\,\text{mA}$, $V_2 = 8\,\text{V}$. Determine the power dissipated in the $2\,\text{k}\Omega$ resistor when $I_1 = 8\,\text{mA}$, $V_2 = 16\,\text{V}$. The network N consists only of resistors.

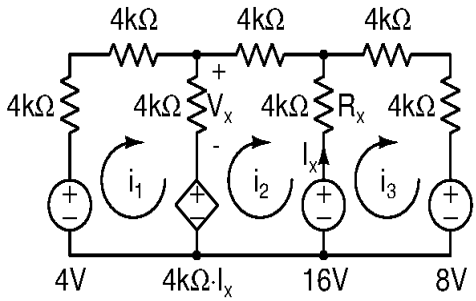
(The answer must be in **milliwatts (mW)**. Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 0

1 point

8)



In the circuit above, determine the contribution of *only the* 4 V source to V_x. You can use any method you wish, but you are encouraged to use mesh analysis. You could also possibly use part of the solution to one of the previous problems.

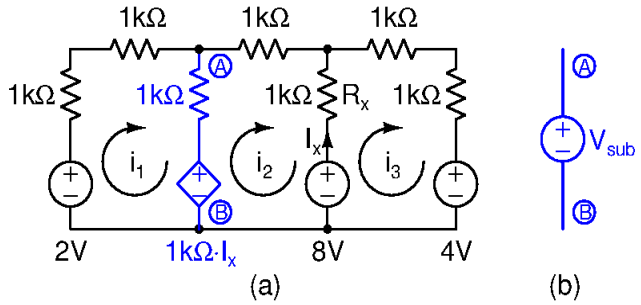
(The answer must be in **volts (V)**. Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.9,1.2

1 point

9)



In the circuit above, the entire combination between A and B, shown in blue, must be substituted by a voltage source of value V_{sub} as shown in (b). Determine V_{sub}. You can use any method you wish, but you are encouraged to use mesh analysis. You could also possibly use part of the solution to one of the previous problems.

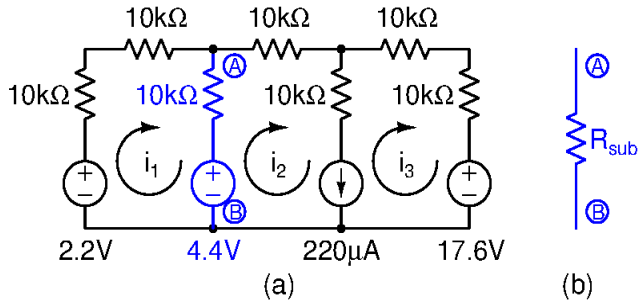
(The answer must be in **volts (V)**. Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 3.5,3.7

1 point

10)



In the circuit above, the entire combination between A and B, shown in blue, must be substituted by a resistance of value R_{sub} as shown in (b). Determine R_{sub}. You can use any method you wish, but you are encouraged to use mesh analysis. You could also possibly use part of the solution to one of the previous problems.

(The answer must be in **kilohms (kΩ)**. Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 52,56

1 point