X

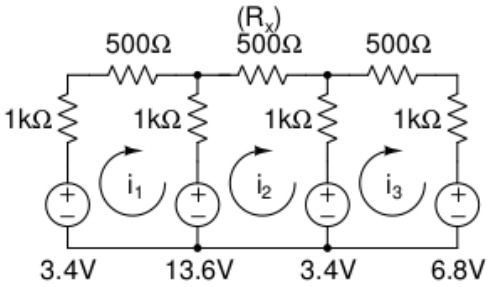
Unit 7 - Week 5 : Mesh analysis; Circuit theorems

Assignment 5

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

Due on 2018-09-12, 23:59 IST.

1)



Setup the mesh analysis equations for the circuit above. Enter the concatenated $[R]$ matrix and the voltage source vector (a 3×4 matrix with the first three columns being the resistance matrix and the fourth column being the source vector) in the space provided below, one row on each line. e.g. if $[R_{mat}]$ and $\overline{V_s}$ are the resistance matrix and the source vector as shown below,

$$[R_{mat}] = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad \text{and} \quad \overline{V_s} = \begin{bmatrix} 2 \\ 3 \\ 4 \end{bmatrix}$$

you should enter

1 0 0 2

0 1 0 3

0 0 1 4

In the matrix entry,

Do not have any space at the start of the line

Have exactly one space between entries on each row

Do not have any space after the last entry in each row

Do not have any trailing zeros, i.e., do not write 5.5 as 5.50 or 5 as 5.0

(The resistance matrix entries should be in **kilohms** (**kΩ**). The source vector entries should be in **volts** (**V**). Round off fractional answers to one decimal place.)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: String) 2.5 -1 0 -10.2-1 2.5 -1 10.20 -1 2.5 -3.4

1 point

2)

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

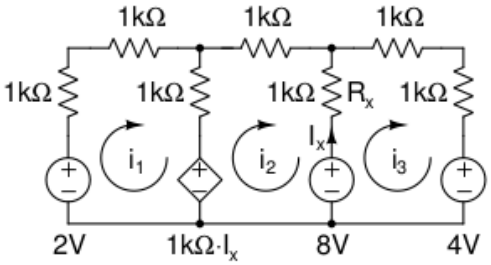
(The answer must be in **milliwatts** (**mW**). Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 3.9,4

1 point

3)



Setup the mesh analysis equations for the circuit above. Enter the concatenated $[R]$ matrix and the voltage source vector (a 3×4 matrix with the first three columns being the resistance matrix and the fourth column being the source vector) in the space provided below, one row on each line. e.g. if $[R_{mat}]$ and $\overline{V_s}$ are the resistance matrix and the source vector as shown below,

$$[R_{mat}] = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad \text{and} \quad \overline{V_s} = \begin{bmatrix} 2 \\ 3 \\ 4 \end{bmatrix}$$

you should enter
1 0 0 2
0 1 0 3
0 0 1 4

In the matrix entry,
Do not have any space at the start of the line
Have exactly one space between entries on each row
Do not have any space after the last entry in each row
Do not have any trailing zeros, i.e., do not write 5.5 as 5.50 or 5 as 5.0

(The resistance matrix entries should be in **kilohms** (**kΩ**). The source vector entries should be in **volts** (**V**). Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 3 -2 1 2-1 4 -2 -80 -1 3 4

1 point

4) Determine I_x in the circuit above.

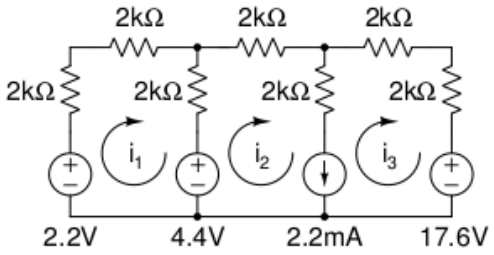
(The answer must be in **milliamperes (mA)**. Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 2.5,2.6

1 point

5)



Setup the mesh analysis equations for the circuit above. Have the equations in the following order: mesh equation, supermesh equation, current source equation. Enter the concatenated $[R]$ matrix and the voltage source vector (a 3×4 matrix with the first three columns being the resistance matrix and the fourth column being the source vector) in the space provided below, one row on each line. e.g. if $[R_{mat}]$ and $\overline{V_s}$ are the resistance matrix and the source vector as shown below,

$$[R_{mat}] = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad \text{and} \quad \overline{V_s} = \begin{bmatrix} 2 \\ 3 \\ 4 \end{bmatrix}$$

you should enter
1 0 0 2
0 1 0 3
0 0 1 4

In the matrix entry,
Do not have any space at the start of the line
Have exactly one space between entries on each row
Do not have any space after the last entry in each row
Do not have any trailing zeros, i.e., do not write 5.5 as 5.50 or 5 as 5.0

(The resistance matrix entries should be in **kilohms** (**kΩ**). The source vector entries should be in **volts** (**V**). Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) 6 -2 0 -2.2-2 4 4 -13.20 1 -1 2.2

1 point

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

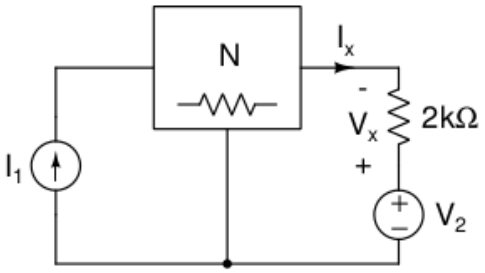
(The answer must be in **milliwatts** (**mW**). Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) -3.6,-3.5

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.

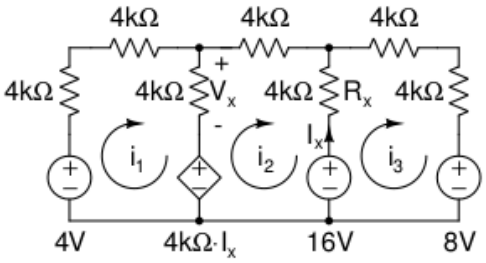
(The answer must be in **milliwatts (mW)**. Round off fractional answers to one decimal place.)

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.

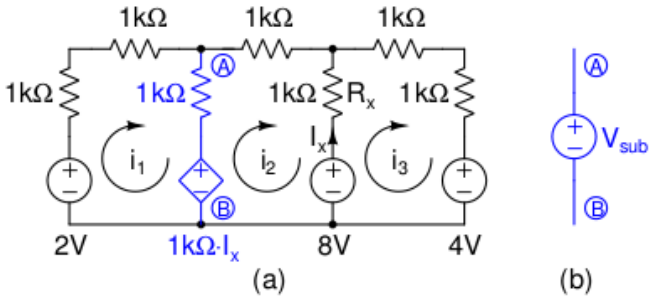
(The answer must be in **volts (V)**. Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 1.1,1.2

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.

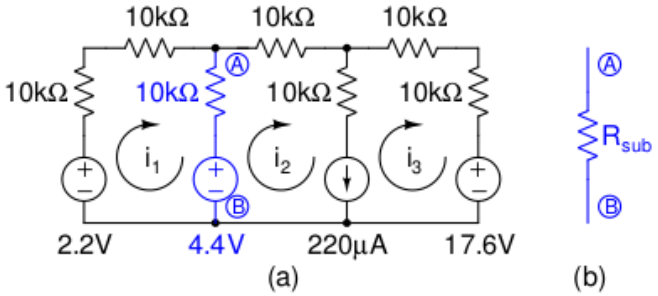
(The answer must be in **volts (V)**. Round off fractional answers to one decimal place.)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 3.6

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: Numeric) 54

1 point

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