Module 1 Quiz

LATEST SUBMISSION GRADE

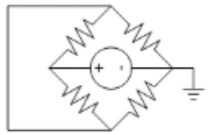
100%

1. A particular point on a wire has a constant $250mA$ of current flowing through it. How much charge has passed through that point in the wire in 4 seconds? Select all possible correct answers. **1 / 1 point**

- [ ] 100mC
- [ ] 62.5C
- [x] 1C
- [ ] 250mC

✓ Correct

2. How many unique nodes does the following circuit have? Put your answer in the box below. **1 / 1 point**



3

✓ Correct

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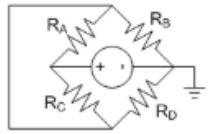
3. Select all the circuits which are electrically equivalent to the one below. Leave all which are not electrically equivalent deselected. 1 / 1 point



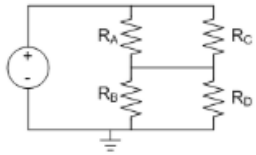


Image 1

Correct

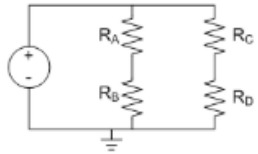


Image 4

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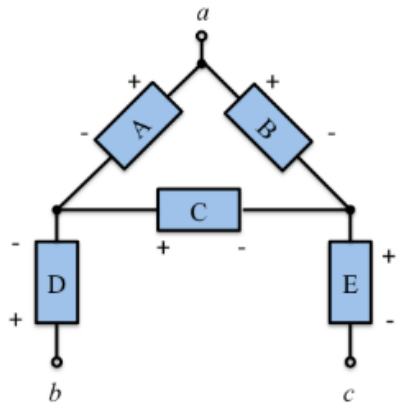
4.

1 / 1 point



For the diagram above, the following voltages are specified:

$v_A = 7V$

$v_B = 5V$

$v_C = -2V$

$v_D = 2V$

$v_{ac} = 10V$

where v_{ac} is the voltage from node c to node a. Find the value of v_{ab} in Volts and enter it in the box below. Omit units from your answer. For example, if the answer is 10V, enter 10.

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Correct

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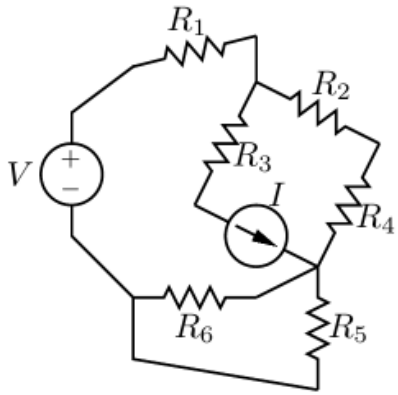
5. 1 / 1 point



Which of the following schematics is equivalent to the one featured above?

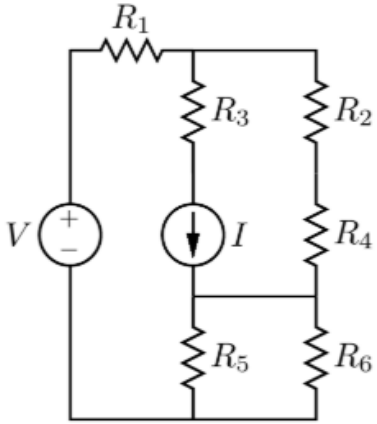


Image 1

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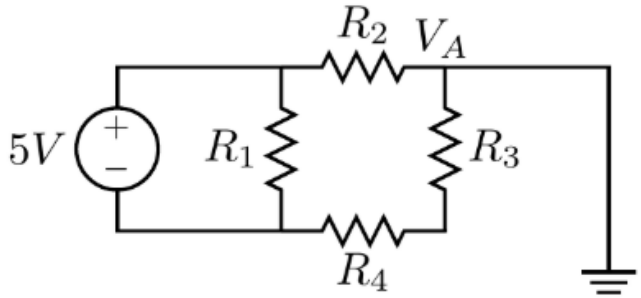
6. Which of the following is a correct equation relating power and energy. **1 / 1 point**

- $p = \frac{dv}{dt} \cdot \frac{di}{dt}$
- $p = \frac{di}{dt}$
- $p = \int_{t_0}^{t} w(\tau)d\tau + w(t_0)$
- $p = \frac{dw}{dt}$ (selected)

Correct

7. What is the voltage V_A? **1 / 1 point**



Select the correct answer from the list below.

- $0V$ (selected)
- $2.5V$
- $5V$
- $-2.5V$

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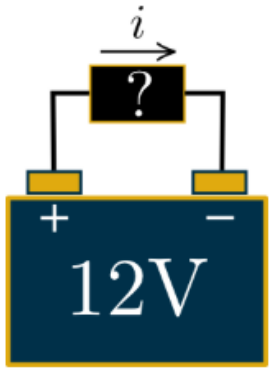
Correct

8. 1 / 1 point



A 12-V battery is connected to a mystery black-box device. The current i is measured to be -2A.

The system remains in this configuration for 10 seconds. How much energy is gained by charging the battery? Following convention, you can indicate energy lost by the battery being used to power the mystery device as a negative number, and energy gained by the charging the battery as positive. Give your answer in joules, and omit units from your answer.

240

Correct

9. 1 / 1 point

Suppose you have a storage device that can store up an amount of charge. You connect your storage device to a mystery device and then measure the amount of charge that is stored on the storage device. The charge is measured to be

$$q(t) = 5\cos(-2000\pi t)\ \text{C}$$

9. Suppose you have a storage device that can store up an amount of charge. You connect your storage device to a mystery device and then measure the amount of charge that is stored on the storage device. The charge is measured to be

1 / 1 point

$$q(t) = 5\cos(-2000\pi t)\ \mathrm{C}$$

Which of the following expressions could possibly represent the current flowing through the the wire connected to the charge-storage device? Select all plausible options.

- [x] $-10000\pi \sin(2000\pi t)\ \mathrm{A}$

Correct

- [ ] $\frac{1}{400}\sin(-2000\pi t)\ \mathrm{A}$
- [ ] $-\frac{1}{400}\sin(-2000\pi t)\ \mathrm{A}$
- [x] $10000\pi \sin(-2000\pi t)\ \mathrm{A}$

Correct

- [ ] $-\frac{1}{400\pi}\pi \sin(-2000\pi t)\mathrm{A}$
- [ ] $-\frac{1}{400\pi}\sin(-2000\pi t)+4\ \mathrm{A}$
- [ ] $-10000\sin(-2000\pi t)\ \mathrm{A}$

10. Batteries have capacities which are often given in units of Ampere-hours (Ah). The stored energy can be derived from the reported Ampere-hours. Consider a AAA battery which has a voltage of $1.25\mathrm{V}$ and a capacity of $500\mathrm{mAh}$. What is the energy capacity of the battery in kilojoules? Omit units from your answer.

1 / 1 point

2.25