DC Circuits #2 (Homework)

INSTRUCTOR
Ian Page
Singapore American School

Current Score

QUESTION	1	2	3	4	5	6	7	8	9	10	11	12
POINTS	2/2 ✓	1/1 ✓	0/1	2/4	5/5 ✓	–/1	–/2	1/4	0/2	–/2	3/4	9/9 ✓

TOTAL SCORE: 23/37 62.2%

Due Date

WED, DEC 18, 2024
11:59 PM GMT+8

REQUEST EXTENSION

Assignment Submission & Scoring

Assignment Submission

For this assignment, you submit answers by question parts. The number of submissions remaining for each question part only changes if you submit or change the answer.

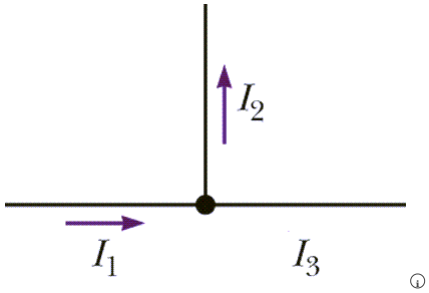
Assignment Scoring

Your last submission is used for your score.

---

1. **[2/2 Points]** DETAILS MY NOTES **SERCPAP12 18.STEP.4.4A.** PREVIOUS ANSWERS ASK YOUR TEACHER PRACTICE ANOTHER

Consider the circuit node in the figure.



Suppose $|I_1|$ = 4.00 A and $|I_2|$ = 8.00 A.

(a) Find the magnitude of I_3 (in A).

4 ✓ A

(b) State whether current I_3 is going into the node or out of the node. If the sign is positive, it indicates current into the node, whereas if it is negative, it represents current coming out of the node.

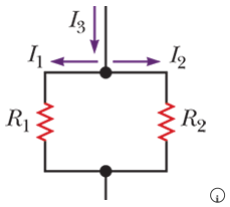
- (●) into
- ( ) out of ✓

Need Help? Read It

---

2. **[1/1 Points]** DETAILS MY NOTES **SERCPAP12 18.STEP.4.5B.** PREVIOUS ANSWERS ASK YOUR TEACHER PRACTICE ANOTHER

Consider the circuit in the following figure.



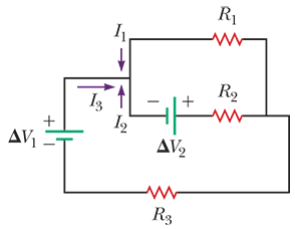
Suppose R_1 = 6.00 Ω and R_2 = 3.00 Ω. If I_1 = 5.00 A, find I_3 (in A) using Kirchhoff's Rules. (Enter the magnitude.)

15 ✓ A

Need Help? Read It

3. [0/1 Points] DETAILS MY NOTES SERCPAP12 18.STEP.4.7A. PREVIOUS ANSWERS ASK YOUR TEACHER PRACTICE ANOTHER

Consider the circuit in the following figure.



Suppose R_1 = 3.00 Ω and R_2 = 8.00 Ω. If R_3 = 5.00 Ω, ΔV_1 = 24.0 V and ΔV_2 = 6.00 V, find I_1 (in A) using Kirchoff's Rules.

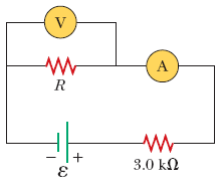
0.857 ✗

Develop three equations and three unknowns using Kirchhoff's Rules, solving for the unknown current. A

Need Help? Read It

4. [2/4 Points] DETAILS MY NOTES SERCPAP12 18.A.P.050. PREVIOUS ANSWERS ASK YOUR TEACHER PRACTICE ANOTHER

For the circuit shown in the figure below, the voltmeter reads 5.9 V and the ammeter reads 3.4 mA.



(a) Find the value of R.

1.74 ✓ kΩ

(b) Find the emf of the battery.

5.90 ✗

Your response differs from the correct answer by more than 10%. Double check your calculations. V

(c) Find the voltage across the 3.0-kΩ resistor.

10.2 ✓ V

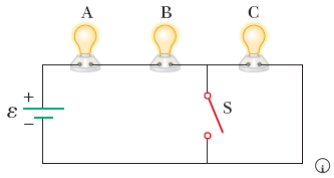
(d) What assumptions did you have to make to solve this problem?

This answer has not been graded yet.

Need Help? Read It

5. **[5/5 Points]** DETAILS MY NOTES **SERCPAP12 18.A.P.055.** PREVIOUS ANSWERS ASK YOUR TEACHER

A circuit consists of three identical lamps, each of resistance R, connected to a battery as in the figure below. (Use the following as necessary: R and E for $\mathcal{E}$.)



(a) Calculate an expression for the equivalent resistance R_{eq} of the circuit when the switch is open. Repeat the calculation when the switch is closed.

open	R_{eq}	=	3R
closed	R_{eq}	=	2R

(b) Write an expression for the power P supplied by the battery when the switch is open. Repeat the calculation when the switch is closed.

open	P	=	E23R
closed	P	=	E22R

(c) Using the results already obtained, explain what happens to the brightness of the lamps when the switch is closed.

when the switch is closed, the total equivalent resistance decreases, causing the total current from the battery to increase. lamps A and B remain equally bright because they are still in series, while lamp C lights up as the right loop is now complete. the battery supplies more power due to the reduced resistance.

Score: 1 out of 1

Comment:

Need Help? Read It

6. **[–/1 Points]** DETAILS MY NOTES **SERCPAP12 18.1.P.001.OP.** ASK YOUR TEACHER

A battery with an emf of 9.45 V is connected to a 69.5 Ω resistor. The current through the battery is 110 mA. What is the battery's internal resistance (in Ω)?

Ω

Need Help? Read It

7. **[–/2 Points]** DETAILS MY NOTES **SERCPAP12 18.1.P.003.** ASK YOUR TEACHER

A battery with an emf of 13.2 V has a terminal voltage of 12.8 V when the current is 3.06 A.

HINT

(a) Calculate the battery's internal resistance r (in ohms).

Ω

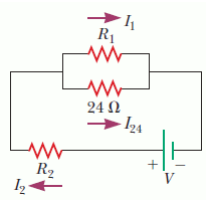
(b) Find the load resistance R (in ohms).

Ω

Need Help? Read It

8. **[1/4 Points]** DETAILS MY NOTES **SERCPAP12 18.4.P.018.** PREVIOUS ANSWERS ASK YOUR TEACHER PRACTICE ANOTHER

Consider the following figure. *Note:* The currents are not necessarily in the direction shown. (Assume R_1 = 10.0 Ω, R_2 = 3.5 Ω, and V = 36 V.)



(a) Find the current in each resistor of the figure above by using the rules for resistors in series and parallel. (Enter your answers in A.)

3.5 Ω 3.41 ✓ A

10.0 Ω 1.002941 ✗

Your response differs from the correct answer by more than 10%. Double check your calculations. A

24 Ω 2.40705 ✗

Your response differs from the correct answer by more than 100%. A

(b) Write three independent equations for the three currents using Kirchhoff's laws: one with the node rule; a second using the loop rule through the battery, the 3.5-Ω resistor, and the 24.0-Ω resistor; and the third using the loop rule through the 10.0-Ω and 24.0-Ω resistors. Solve to check the answers found in part (a). (Submit a file with a maximum size of 15 MB.)

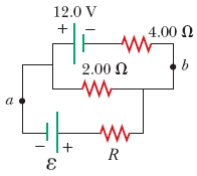
Choose file No file chosen

This answer has not been graded yet.

Need Help? Read It

9. **[0/2 Points]** DETAILS MY NOTES **SERCPAP12 18.4.P.020.** PREVIOUS ANSWERS ASK YOUR TEACHER PRACTICE ANOTHER

For the circuit shown in the figure, calculate the following. (Assume $\mathcal{E}$ = 7.80 V and R = 6.12 Ω.)



(a) the current in the 2.00-Ω resistor (Enter the magnitude.)

2.04 ✗

Your response differs from the correct answer by more than 100%. A

(b) the potential difference between points a and b, $\Delta V = V_b - V_a$

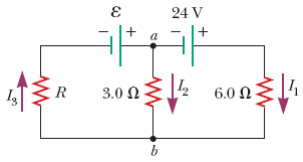
0.005 ✗

Your response differs significantly from the correct answer. Rework your solution from the beginning and check each step carefully. V

Need Help? Read It

10. **[-/2 Points]** DETAILS MY NOTES **SERCPAP12 18.4.P.022.** ASK YOUR TEACHER

In the circuit of the figure below, the current I_1 is 2.1 A and the values of $\mathcal{E}$ and R are unknown. What are the currents I_2 and I_3? (Enter the magnitude only.)



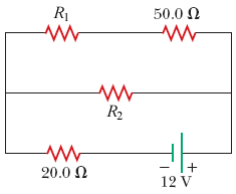
I_2 = A

I_3 = A

Need Help? Read It

11. **[3/4 Points]** DETAILS MY NOTES **SERCPAP12 18.4.P.024.** PREVIOUS ANSWERS ASK YOUR TEACHER PRACTICE ANOTHER

Four resistors are connected to a battery with a terminal voltage of 12 V, as shown in the figure below. (Assume R_1 = 36.0 Ω and R_2 = 74.0 Ω.)



(a) How would you reduce the circuit to an equivalent single resistor connected to the battery? Use this procedure to find the equivalent resistance of the circuit.

59.8 ✔ Ω

(b) Find the current delivered by the battery to this equivalent resistance.

0.201 ✔ A

(c) Determine the power delivered by the battery.

2.41 ✔ W

(d) Determine the power delivered to the 50.0-Ω resistor.

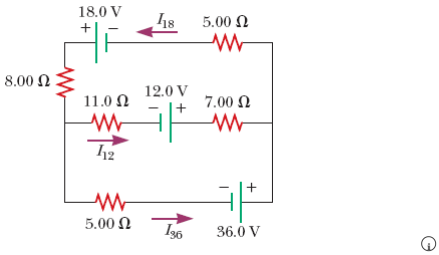
4 ✖

Your response differs from the correct answer by more than 100%. W

Need Help? Read It

12. **[9/9 Points]** DETAILS MY NOTES **SERCPAP12 18.4.P.030.** PREVIOUS ANSWERS ASK YOUR TEACHER

For the circuit shown in the figure below, use Kirchhoff's rules to obtain equations for the upper loop, the lower loop, and the node on the left side. In each case suppress units for clarity and simplify, combining like terms. (Use the following as necessary: I_{18}, I_{12}, and I_{36}.)



(a) the upper loop

13*I*18+18*I*12

✔ = 30.0 V

(b) the lower loop

5*I*36−18*I*12

✔ = 24.0 V

(c) the node on the left side

*I*12+*I*36

✔ = I_{18}

(d) Solve the node equation for I_{36}.

*I*18−*I*12

✔ = I_{36}

(e) Using the equation found in (d), eliminate I_{36} from the equation found in part (b).

5*I*18−23*I*12

✔ = 24

(f) Solve the equations found in part (a) and part (e) simultaneously for the two unknowns for I_{12} and I_{18}, respectively. (Enter your answers in A.)

I_{12} = -0.416 ✔ A

I_{18} = 2.88 ✔ A

(g) Substitute the answers found in part (f) into the node equation found in part (d), solving for I_{36}. (Enter your answer in A.)

I_{36} = 3.296 ✔ A

(h) What is the significance of the negative answer for I_{12}?

shows the vector of the current

Score: 1 out of 1

Comment:

Need Help? Read It

Home My Assignments Request Extension