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INSTRUCTOR

Joel DeWitt

East Carolina University

# Chapter 19 (Homework)

## Current Score

QUESTION

1

2

3

4

5

6

7

8

9

10

POINTS

1/1

1/1

-1

1/3

1/1

2/2

-1

1/2

1/2

2/2



TOTAL SCORE

10/16

62.5%

## Due Date

TUE, OCT 13, 2020

11:50 PM EDT

11:59 PM EDT



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**Description****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. [1/1 Points]

DETAILS

PREVIOUS ANSWERS

COLFUNPHYS1 19.P.002.

MY NOTES

ASK YOUR TEACHER

PRACTICE ANOTHER

A current of 2.65 A flows through a 1.04 mm diameter copper wire that is connected to a capacitor plate. The current is directed toward the plate. Find the charge transferred to the plate in  $9.80 \times 10^{-4}$  s.



2. [1/1 Points]

DETAILS

PREVIOUS ANSWERS

COLFUNPHYS1 19.P.004.

MY NOTES

ASK YOUR TEACHER

In what appears to be a single lightning bolt, there are typically several distinct strokes over the same path, each lasting on the order of  $10^{-4}$  s, with an interval of about 0.05 s between them. The duration of the several strokes is about 0.20 s. Thus, although the peak current may reach a maximum of 20,000 A, the average current over the 0.20 s is much less—typically about 120 A upward. Find the charge transferred to one point on the earth's surface during a typical 0.20 s discharge.



3. [-/1 Points]

DETAILS

COLFUNPHYS1 19.P.005.

MY NOTES

ASK YOUR TEACHER

PRACTICE ANOTHER

A certain resistor is made with a 49.8 m length of fine copper wire,  $4.54 \times 10^{-2}$  mm in diameter, wound onto a cylindrical form and having a fiber insulator separating the coils. Calculate the resistance. (The resistivity of copper is  $1.72 \times 10^{-8} \Omega\cdot\text{m}$ .)

4. [1/3 Points]

DETAILS

PREVIOUS ANSWERS

COLFUNPHYS1 19.P.006.

MY NOTES

ASK YOUR TEACHER

PRACTICE ANOTHER

There is a potential difference of 1.8 V between the ends of a 20 cm long graphite rod that has a cross-sectional area of 1.3 mm<sup>2</sup>. The resistivity of graphite is  $7.5 \times 10^{-6} \Omega\cdot\text{m}$ .

(a) Find the resistance of the rod.

(b) Find the current.

 ✖

(c) Find the electric field inside the rod.

 ✔

5. [1/1 Points]

DETAILS

PREVIOUS ANSWERS

COLFUNPHYS1 19.P.009.

MY NOTES

ASK YOUR TEACHER

PRACTICE ANOTHER

When an electric heater is turned on, the Nichrome heating element is at  $0^\circ\text{C}$  and draws a current of  $15\text{ A}$ , with a potential difference of  $120\text{ V}$  between the ends of the element. The element heats up to  $818^\circ\text{C}$ , with the potential difference constant. Find the final current. (The temperature coefficient of resistivity of Nichrome is  $4.0 \times 10^{-4} (\text{C}^\circ)^{-1}$ .)



6. [2/2 Points]

DETAILS

PREVIOUS ANSWERS

COLFUNPHYS1 19.P.011.

MY NOTES

ASK YOUR TEACHER

PRACTICE ANOTHER

In order to **quadruple** its resistance, by how much would you have to increase the temperature of a piece of the following?

(a) copper (The temperature coefficient of resistance for copper is  $3.9 \times 10^{-3} (\text{C}^\circ)^{-1}$ .)

 $^\circ\text{C}$ 

(b) Nichrome (The temperature coefficient of resistance for Nichrome is  $4.0 \times 10^{-4} (\text{C}^\circ)^{-1}$ .)

 $^\circ\text{C}$ 

7. [-/1 Points]

DETAILS

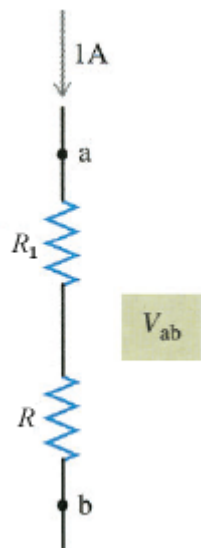
COLFUNPHYS1 19.P.012.

MY NOTES

ASK YOUR TEACHER

PRACTICE ANOTHER

Find the value of resistance  $R$  in the figure below. (Take  $V_{ab} = 21\text{ V}$  and  $R_1 = 13\ \Omega$ .)



8. [1/2 Points]

DETAILS

PREVIOUS ANSWERS

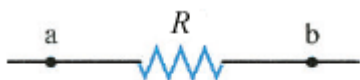
COLFUNPHYS1 19.P.013.

MY NOTES

ASK YOUR TEACHER

PRACTICE ANOTHER

Consider the following.



$$V_{ba} = 12 \text{ V}$$

(a) Find the current through the resistor in the figure above. (Take  $R = 5 \, \Omega$ .)

 ✓

(b) If the resistor is made of carbon, what will its resistance be when its temperature is increased by  $98.0 \, ^\circ\text{C}$ ? (The temperature coefficient of resistivity for carbon is  $-5.0 \times 10^{-4} \, (^\circ\text{C})^{-1}$ .)

9. [1/2 Points]

DETAILS

PREVIOUS ANSWERS

COLFUNPHYS1 19.P.018.

MY NOTES

ASK YOUR TEACHER

PRACTICE ANOTHER

When a car's starter is in use, it draws a large current. The car's lights draw much less current. As a certain car is starting, the current through the battery is  $57.6 \, \text{A}$  and the potential difference across the battery terminals is  $9.09 \, \text{V}$ . When only the car's lights are used, the current through the battery is  $1.92 \, \text{A}$  and the terminal potential difference is  $12.5 \, \text{V}$ . Find the battery's emf.

 ✓

Find the internal resistance.

10. [2/2 Points]

DETAILS

PREVIOUS ANSWERS

COLFUNPHYS1 19.P.019.

MY NOTES

ASK YOUR TEACHER

PRACTICE ANOTHER

Car batteries are often rated in amp-hours. This rating indicates the quantity of charge that can pass through the battery before the battery's chemical energy must be restored by the car's generator or some other source. The amp-hour unit is convenient for simple calculations. For example, a 60-amp-

hour battery can supply a current of 1.0 A for 60 h (or 60 A for 1.0 h) before going dead. Find the energy stored in the following.

(a) a 63 A-h, 11 V car battery

2.495e6 J



(b) a 1.1 A-h, 1.6 V flashlight battery

6336 J



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