Quiz Average 9.60 Quiz High Score 10

PH 221

Quiz # 05 (10 pts)

Name Solution

A wire is carrying a current of 435. mA. How long will it take for a total charge of 372. mC to pass a reference point in the wire?

Α.

 $1.17 \times 10^{0} \text{ s}$ **B.** $8.55 \times 10^{-4} \text{s}$ **C.** $8.55 \times 10^{-1} \text{ s}$ **D.** $1.17 \times 10^{3} \text{ s}$

$$\boldsymbol{i} = \frac{\Delta \boldsymbol{Q}}{\Delta \boldsymbol{t}}$$

Solve for Δt

$$\Delta t = \frac{\Delta Q}{i} = \frac{372. \ mC}{435. \ mA} = 0.855 \ s$$

So, the correct answer is C!

A typical starter motor for car requires a power of 1830. W having a voltage across the starter motor of 3.10 V. What is the effective resistance of the starter motor?

A. 5.25 x $10^{-3} \Omega$ **B.** $1.90 \times 10^2 \Omega$ **C.** $5.90 \times 10^2 \Omega$ **D.** $1.69 \times 10^{-3} \Omega$

$$P=\frac{V^2}{R}$$

Solve for resistance *R*

$$R = \frac{V^2}{P} = \frac{(3.10 V)^2}{1830.W} = 5.25 \times 10^{-3} \Omega$$

So, the correct answer is A!

A hobbyist wants to show off to his friends by using a resistor made of gold $(\rho_{Au}=2.44~x~10^{-8}~\Omega~m)$. The needed resistance is $(R=5.37~x~10^{-6}~\Omega)$. If the cross-sectional area is known to be $(A=2.89~x~10^{-4}~m^2)$, what should the length of the bar of gold be?

A. $1.31 \times 10^{-6} \text{ m}$

C. $1.57 \times 10^{1} \text{ m}$

B. $4.53 \times 10^{-10} \text{ m}$

 $6.36 \times 10^{-2} \text{ m}$

$$R = \frac{\rho L}{A}$$

D.

Solve for length L

$$L = \frac{AR}{\rho_{Au}} = \frac{(2.89 \times 10^{-4} \, m^2)(5.37 \times 10^{-6} \, \Omega)}{2.44 \times 10^{-8} \, \Omega \, m} = \frac{1.552 \times 10^{-9} \, \Omega m^2}{2.44 \times 10^{-8} \, \Omega \, m} = 6.36 \times 10^{-2} \, m$$

So, the correct answer is D!

A lantern battery is listed with a capacity of $22.0 \, \mathrm{Ah}$. The light bulb for the lantern draws a current of $0.833 \, \mathrm{A}$. How long will the battery be able to keep the light bulb glowing?

A. 0.055 h

B. 26.4 h C.

D. 0.038 h

 $Battery\ Capacity = Charge = it$

18.3 h

Solve for time t

$$t = \frac{Battery\ Capacity}{i} = \frac{22.0\ Ah}{0.833\ A} = 26.4\ h$$

So, the correct answer is B!

What is the voltage across a circuit element that has a resistance of $14.3~\Omega$ and carries a current of 3.69~A?

A. 3.88 V

B. 0.258 V

C. 52.8 V

D. 195. V

$$V = iR = (3.69 A)(14.3\Omega) = 52.8 V$$

So, the correct answer is C!

<u>Dr. Donovan's Classes</u> <u>Page</u> Dr. Donovan's PH 221
Lecture Quiz & Exam
Solutions

NMU Physics

Department Web Page

NMU Main Page

Please send any comments or questions about this page to ddonovan@nmu.edu
This page last updated on October 4, 2024