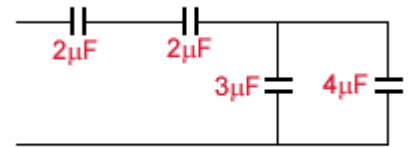


Sample problems for the 2nd midterm

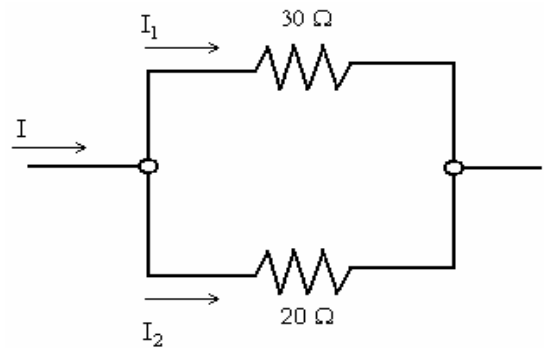
1. What is the peak voltage when the rms is 50 V?
2. Find the capacitance of the parallel plate capacitor, knowing the area = $2.7 \times 10^{-4} \text{ m}^2$, the distance = $1.0 \times 10^{-5} \text{ m}$, and no dielectric inside the capacitor.
3. Find the length of nicrome for the following case. The resistance = 100Ω , the cross-sectional area = $1.2 \times 10^{-2} \text{ m}^2$, and the resistivity = $6.8 \times 10^{-5} \Omega\text{m}$.
4. Explain about the electric potentials in terms of equipotential lines.
5. When you measure that voltage = 4.0 V, and resistance = 5.0 k Ω , what is the current flow?
6. When the charges (= $2.0 \times 10^{-4} \text{ C}$) go through some cross section in $1.0 \times 10^{-3} \text{ s}$, what is the current flow?
7. When you find the power dissipated in a 3.0-k Ω resistor as 100 W, what is the source voltage?
8. An electric charge can have the forces associated with a couple of fields. One is due to the electric field, $F = qE$. The other is due to magnetic field, $F = qvB$. What are the differences of the properties between those forces?
9. If you use 30-V voltage source to store the charges in a capacitor (= 2.4 μF), what is the maximum charge in the capacitor?

10. In an electric potential mapping lab, you find two equipotential lines. With multimeter, the potential difference between them is 2.6 V. With a ruler, the distance between the lines is 0.022 m. Find the magnitude of the electric field.

11. What is the equivalent capacitance?



12. The total current of the circuit is 3.4 A. Find the current I_1 and I_2 .



13. Here is a circular loop. The number of the loop is 38, and the current flow is 1.80 A. When the magnetic field created by the current is 0.005 T, what is the radius of the loop?

Answer keys:

1. 70.7 V
2. 2.39×10^{-10} F
3. 1.76×10^4 m
5. 8.0×10^{-4} A
6. 0.2 A
7. 547.7 V
9. 7.2×10^{-5} C
10. 118 V/m
11. 0.875 μ F
12. 1.36 A
13. 8.6×10^{-3} m