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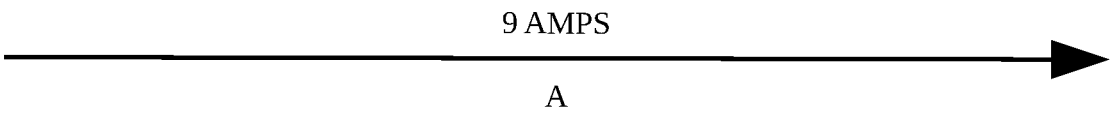
Quiz #4: Magnetic Fields of a Wire, Circuits

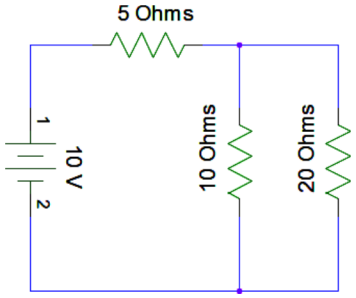
Questions 1 and 2 refer to the following diagram.



1. A wire carries a current of 9 amps to the right, as shown. What is the magnetic field strength at point A, located 3 cm below the wire?
   a) 0 T
   b) $3\pi \times 10^{-7}$ T
   c) 6×10^{-5} T
   d) 1.5×10^{-3} T
   e) None of the Above

2. A second wire carries an equal amount of current as the wire in question #1. Which configuration would cause the magnetic force between the wires to always be attractive?
   a) Horizontal, parallel to the first wire, carrying current to the right.
   b) Horizontal, antiparallel to the first wire, carrying current to the left.
   c) Perpendicular to the first wire, carrying current toward the top of the page.
   d) Perpendicular to the first wire, carrying current into the page.
   e) None of these orientations guarantee attractive force.

Question 3-4 refer to the following diagram



3. What is the equivalent resistance of the circuit in the diagram?
   a) 2.857 Ω b) 4.286 Ω c) 11.666 Ω d) 35 Ω e) 10 000 Ω

4. Which of the following statements is true concerning the voltages of the 5, 10, and 20 ohm resistors?
   a) $V_5 > V_{10} > V_{20}$
   b) $V_{10} > V_{20} > V_5$
   c) $V_{10} = V_{20} > V_5$
   d) $V_5 > V_{10} = V_{20}$
   e) $V_{20} > V_{10} > V_5$

5. A capacitor has a capacitance of 0.1 Farads. A voltage of 400 volts is applied to the capacitor. What is the charge stored in the capacitor?
   a) 400 C b) 40 C c) 2.5 C d) 0.25 C e) 0.0025 C

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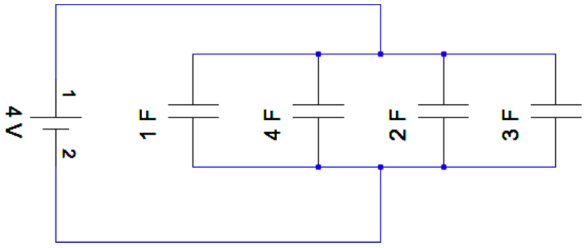
6. A current of 5 amps passes through a resistor of R = 3 Ω. What is the power dissipated by the resistor?
   a) 3 W b) 5 W c) 15 W d) 45 W e) 75 W

Questions 7 and 8 refer to the following diagram



7. What is the voltage drop across the 4 F capacitor?
   a) 0.25 V b) 1 V c) 4 V d) 16 V e) 64 V

8. What is the total charge stored in the circuit?
   a) 0.48 C
   b) 4 C
   c) 33.33 C
   d) 40 C
   e) There is not enough information to solve this problem

9. What is the function of Inductors, Capacitors, and Resistors?

	Inductor	**Capacitor**	**Resistor**
(a)	Stores energy in a magnetic field	Stores energy in an electric field	Dissipates energy as heat
(b)	Dissipates energy as heat	Stores energy in a magnetic field	Stores energy in an electric field
(c)	Stores energy in an electric field	Dissipates energy as heat	Stores energy in a magnetic field
(d)	Stores energy in an electric field	Stores energy in a magnetic field	Dissipates energy as heat
(e)	Stores energy in an electric field	Dissipates energy as heat	Stores energy in a magnetic field

10. A current of 3 amps is flowing in a simple circuit with one resistor. If another resistor is added to the circuit, the current will be -
    a) Less than 3 Amps
    b) Exactly 3 Amps
    c) More than 3 Amps
    d) It cannot be determined without knowing the resistances of the resistors and the voltage of the source
    e) It cannot be determined without knowing if the resistor is added in parallel or series.