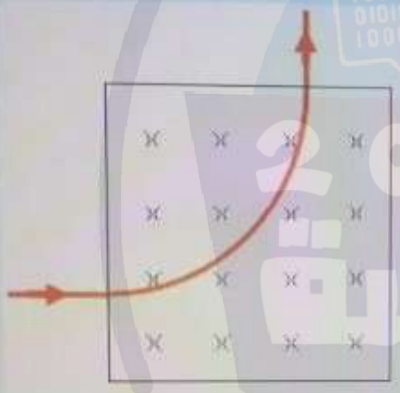
A beam of protons travelling at 12.5 km/s in the positive x-direction (to the right) enters a uniform magnetic field that is perpendicular to the page and into it (in the negative z-direction). The protons leave the region of magnetic field moving in the positive y-direction. The protons travel a distance of 2.0 cm while in the field. What is the magnitude of the magnetic field (in mT)? (mp = 1.67x10^(-27) kg, Qp = 1.6x10^(-19) C).



Select one:

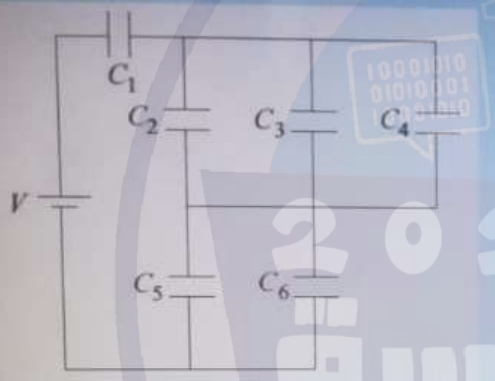
- a. 8.1.
- b. 5.0.
- c. 2.0.
- d. 10.0.
- e. 3.4.

Four wires are each carrying 6.0 A. The wires are located at the 4 corners of a square with side length 9.0 cm. All of these wires are carrying current out of the page. The magnetic field (in T) at one corner of the square is:

Select one:

- a. 4.0 x 10^-6.
- b. 2.8 x 10^-5.
- c. 2.8 x 10^-6.
- d. 4.0 x 10^-5.
- e. 11.2 x 10^-5.

In the figure shown, what is the equivalent capacitance (in microFarad) of the circuit shown if each capacitor has a capacitance of 3 microFarad?



Select one:

- a. 16/11.
- b. 12.
- c. 10/6.
- d. 18/11.
- e. 12/11.

A capacitor is charged up to 18 volts, and then connected in series to a resistor. After 10 seconds, the capacitor voltage has fallen to 12 volts. What will the voltage be after another 16 seconds (26 seconds total)?

Select one:

- a. 9 V.
- b. 10 V.
- c. 6 V.
- d. 0 V.
- e. 8 V.

Which of the following statements is correct for a charged particle moving in a uniform magnetic field?

Select one:

- a. The magnetic force increases the kinetic energy of the charged particle.
- b. The magnetic force does work on it.
- c. The magnetic force acting on it is parallel to the magnetic field.
- d. The magnetic force ALWAYS perpendicular to the particle's velocity.
- e. The magnetic force acting on it is antiparallel to the magnetic field.

Three resistors, R1, R2, R3, are in series with each other. R1<R2<R3. The current through R1 is I.
Which statement is true?

Select one:

- a. If the resistors are made of the same material, and have the same cross-sectional area, then R1 is the longest.
- b. R1 has the largest potential difference across it.
- c. The power dissipated by each resistor is the same.
- d. The potential difference across each resistor is the same.
- e. R3 has the largest potential difference across it.

Three capacitors (30, 30, 10) microFarad were connected in series. If each of the capacitors has the same breakdown voltage of 15V, then the breakdown voltage of the combination will be (in volt):

Select one:

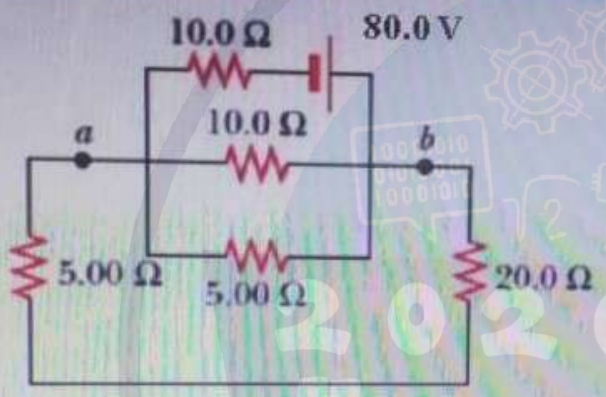
- a. 10.
- b. 25.
- c. 90.
- d. 15.
- e. 45.

A 2.0 m wire is formed into a 5-turn circular loop. If the wire carries a 1.6 A current, determine the magnitude of the magnetic field (in microTesla) at the center of the loop.

Select one:

- a. 9.4.
- b. 69.
- c. 59.
- d. 79.
- e. 89.

Consider the circuit shown in figure. Find the current in the resistor R = 20.0 Ohm.



Select one:

- a. 0.455 A.
- b. 0.921 A.
- c. 0.723 A.
- d. 0.125 A.
- e. 0.227 A.

A loop of area (A) with number of turns (N), each carrying a current (I), is placed in a magnetic field (B). The torque (in N.m) on the loop when the field is oriented at a 30 degrees angle to the plane of the loop is: [Take: A = 0.12 m^2, N = 200, I = 0.5 A, B = 0.05 T].

Select one:

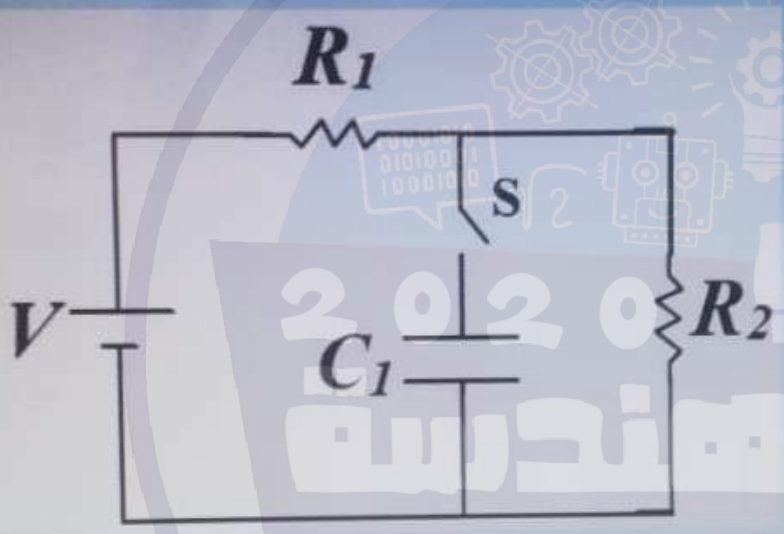
- a. 0.6.
- b. 13.
- c. 2.5.
- d. 0.52.
- e. 0.3.

A wire consisting of a semicircle of radius R = 10 cm and two straight segments each of length 10 cm. The wire is placed in a uniform magnetic field of B = 1.5 T that is perpendicular and into the page. Find the net magnetic force (in N) acting on this wire when it carries a current I= 5.0 A as shown in the figure.

Select one:

- a. 3.0 vertically downwards.
- b. 1.50 vertically upwards.
- c. 3.0 vertically upwards.
- d. 4.5 vertically upwards.
- e. 1.50 vertically downwards.

After the switch S has been closed for a very long time in the adjacent circuit, the potential difference (in volt) across the capacitor is: (given that V=30 volts, R1=40 Ohm, R2=60 Ohm, C1=40 microFarad).



Select one:

- a. 20.0.
- b. 30.0.
- c. 14.
- d. 12.
- e. 18.