BRAC UNIVERSITY

Principles of Physics-II (PHY-112)

Department of Mathematics and Natural Sciences

Assignment: 04 — **Section**: 08

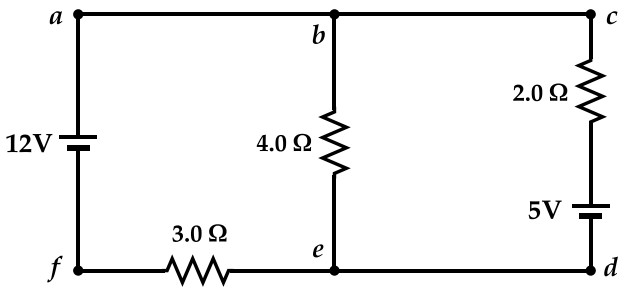
Dispatch Date: April 22, 2024

Submission Deadline: April 29, 2024

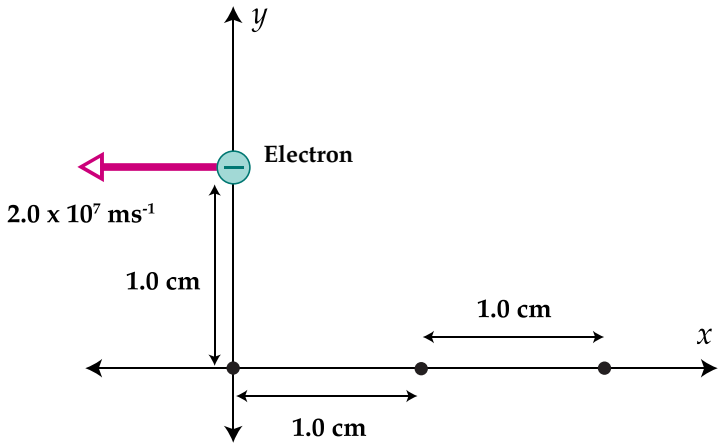
Duration: 7 Days | **Spring 2024 (10F-31C)** | Marks: 15

Attempt all questions. Show Your work in detail. 1:1 plagiarism will be strictly penalized.

1. Find (i) the current and (ii) the power dissipated through each resistor. **Note:** Use Kirchhoff's rule only. Any other shortcut utilization of a random formula or method will not be accepted as the correct answer. [**Hint**: Current splits at the junction b. You may apply the Junction rule there. You may apply the Loop rule on the left and right loops. This will leave You with 3 equations with 3 unknown variables.] **(5)**



2. Find the magnetic field (magnitude and direction) at the dotted locations. **(5)**



3. An electron moves in a particle accelerator of diameter 40 cm perpendicular to a Magnetic Field equal to 0.150 T. Find (i) the speed of the electron and (ii) the period of the motion, (iii) the work done on the electron by $\vec{F}_B$, (iv) the kinetic energy of the electron when it emerges out of the cyclotron accelerated? **Note**: Do not write down the formula directly. Explain circular motion in terms of $\vec{B}$, $\vec{F}_B$, and $\vec{v}$. [**Hint**: Rotational Kinetic Energy $K = \frac{1}{2}Mr^2\omega^2$.] **(5)**