Physics 10164 - Exam 2C

Partial credit will be given provided you show all work and are solving parts of the problem correctly. Points will be deducted if you don't show your work even if you get the right answer. <u>Clearly indicate your answer with a circle or a box</u> and remember to include correct units and significant figures.

- 1. (40 pts) For the circuit below, $R_1 = 1.0$ Ohms, $R_2 = 2.0$ Ohms, and $R_3 = 3.0$ Ohms.
- a) When the switch is closed, what is the power dissipated by the resistor R3?

b) When the switch is opened, does the power dissipated by R3 increase, decrease or remain the same? Justify your answer logically or mathematically.



2. (30 pts) A proton starts at rest and is accelerated through a potential difference of 1200 Volts in the +x direction. It then enters a region of a 6.5 Tesla uniform magnetic field in the plane of the page pointing toward the top of the page as shown.

a) In what direction is the magnetic force felt by the proton?

b) The proton begins to move in a circular path perpendicular to the magnetic field lines. What is the radius of the circle?

c) What must be the magnitude and direction of the uniform electric field needed in this region to ensure the proton moves in a straight line upon entering the region?



#3. (30 pts) Wire A carries a current of 1.2 Amps and passes through the origin. Wire B carries a current of 16 Amps and passes through the x-axis at x = 2.3 meters.

Determine the magnitude and direction of the magnetic field due to these two wires at point P, which is at coordinate (x,y) = (0,-1.1) meters.

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