Physics 10164 - Exam 1B

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 <u>units</u> and <u>significant figures</u>.

- 1. (35 pts) A -3.5 μC charge is located at the origin. A +6.3 μC charge is located at x = 44 cm.
- a) What is the magnitude and direction of the electric field at the position x = -33 cm?
- b) What is the magnitude and direction of the electric field at the position y = +33 cm?

2. (35 pts) A proton is located at the origin. An electron is initially at rest at x = 36 mm. The only force in this problem that is relevant is the electric force. After the electron moves a distance of 12 mm in response to the proton's electric field, how fast is the electron moving?

#3. (30 pts) The resistivity of copper is 1.7 x 10-8 Ohm-m. Suppose you have a household wire with a diameter of 1.2 mm and length 41 meters. The wire has a current of 9.5 Amps running through it. If the cost of energy is 13 cents/kw-hr, find out how much money is being lost due to the power dissipated by the resistance of this wire in one day, to the nearest penny.