## <u>Physics 10164 - Summer 2016 - Exam 1</u>

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) Three charges are arranged in a line as shown below.

a) Determine the net electric force on the -2.2  $\mu C$  charge due to the other charges.

b) If the 3.5  $\mu$ C charge is located at the origin (x=0), where on the x-axis (besides infinity) must the -2.2  $\mu$ C charge be placed in order to feel no electric force?



2. (30 pts) Now the three charges are arranged as shown below. The -2.2  $\mu C$  charge is exactly in between the other two charges.

a) What is the electric potential felt by the -2.2  $\mu C$  charge due to the other two charges?

b) How much work must be done by an applied force in order to move the -2.2  $\mu$ C charge from its initial location to infinity, assuming it starts and ends at rest and that the electric and applied forces are the only two forces that are relevant?



2.4 m

#3. (35 pts) For the circuit below,  $R_1 = 1.0 \Omega$ ,  $R_2 = 2.0 \Omega$ ,  $R_3 = 3.0 \Omega$ ,  $R_4 = 4.0 \Omega$ ,  $R_5 = 5.0 \Omega$ . Determine the current passing through resistor  $R_3$ .

