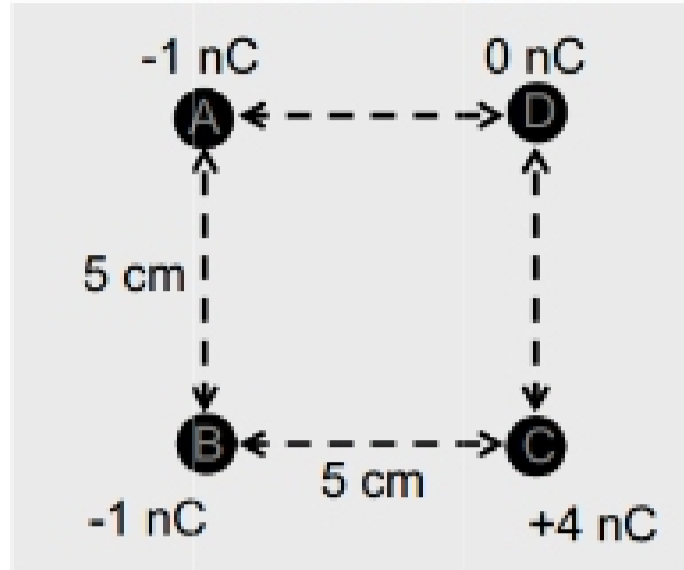
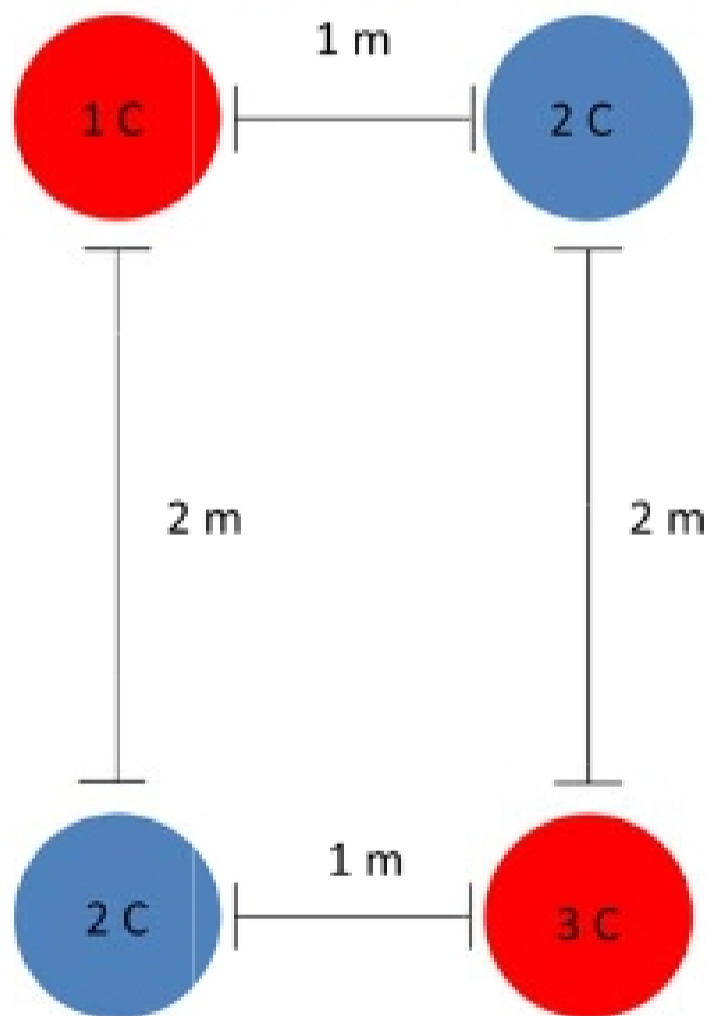


- 1) Using the diagram below, determine the direction of the vector of the net electrostatic force on charge B.



- 2) Three point charges are arranged on a line. Charge $q_3 = +4.00 \text{ nC}$ and is at the origin. Charge $q_2 = -3.00 \text{ nC}$ and is at $x = +2.00 \text{ cm}$. Charge q_1 is at $x = +1.00 \text{ cm}$. What is the magnitude and sign of q_1 if the net force on q_3 is zero?

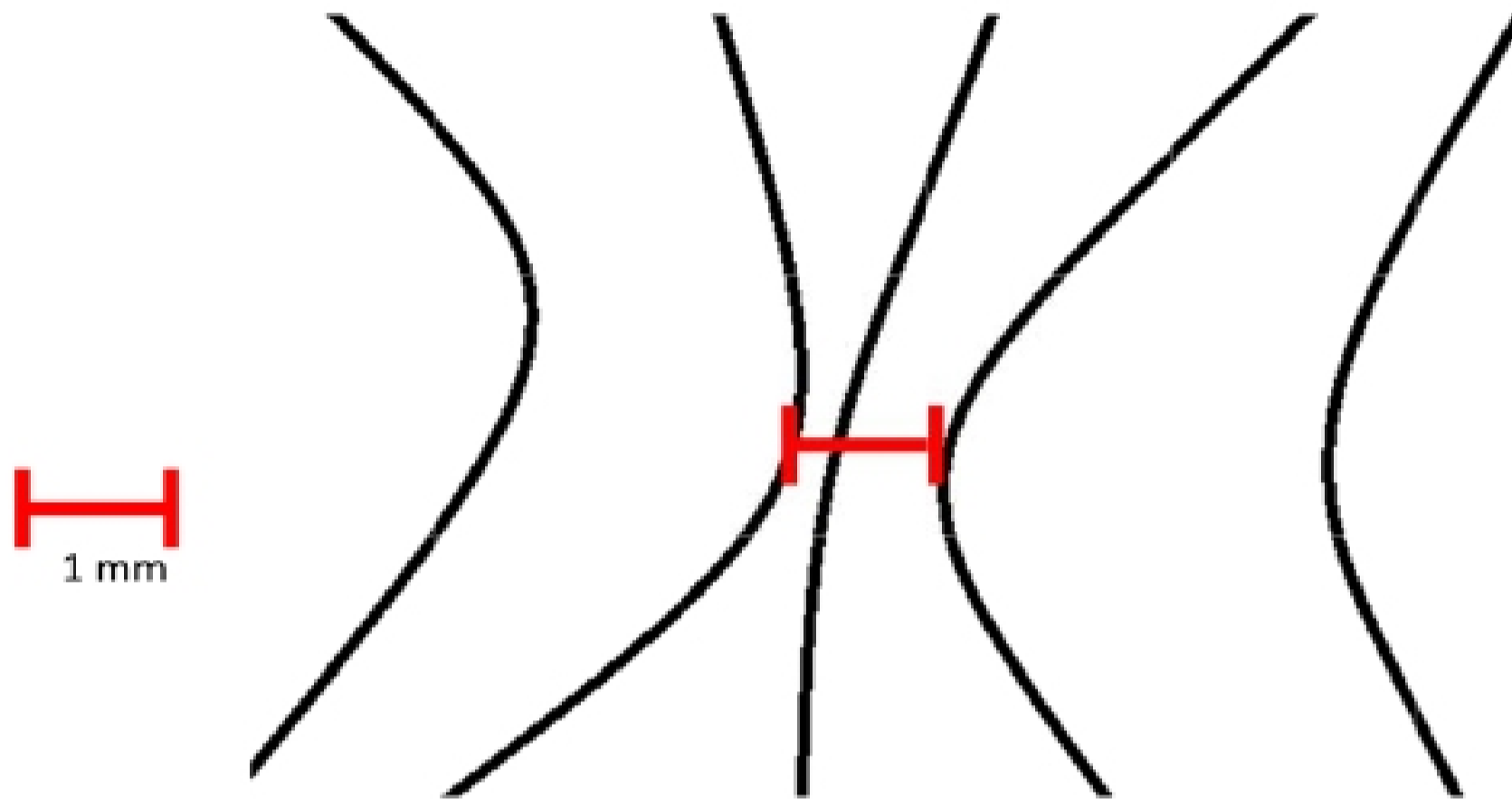
- 3) What is the total electric potential energy of this system? Take $V = 0$ at infinity.



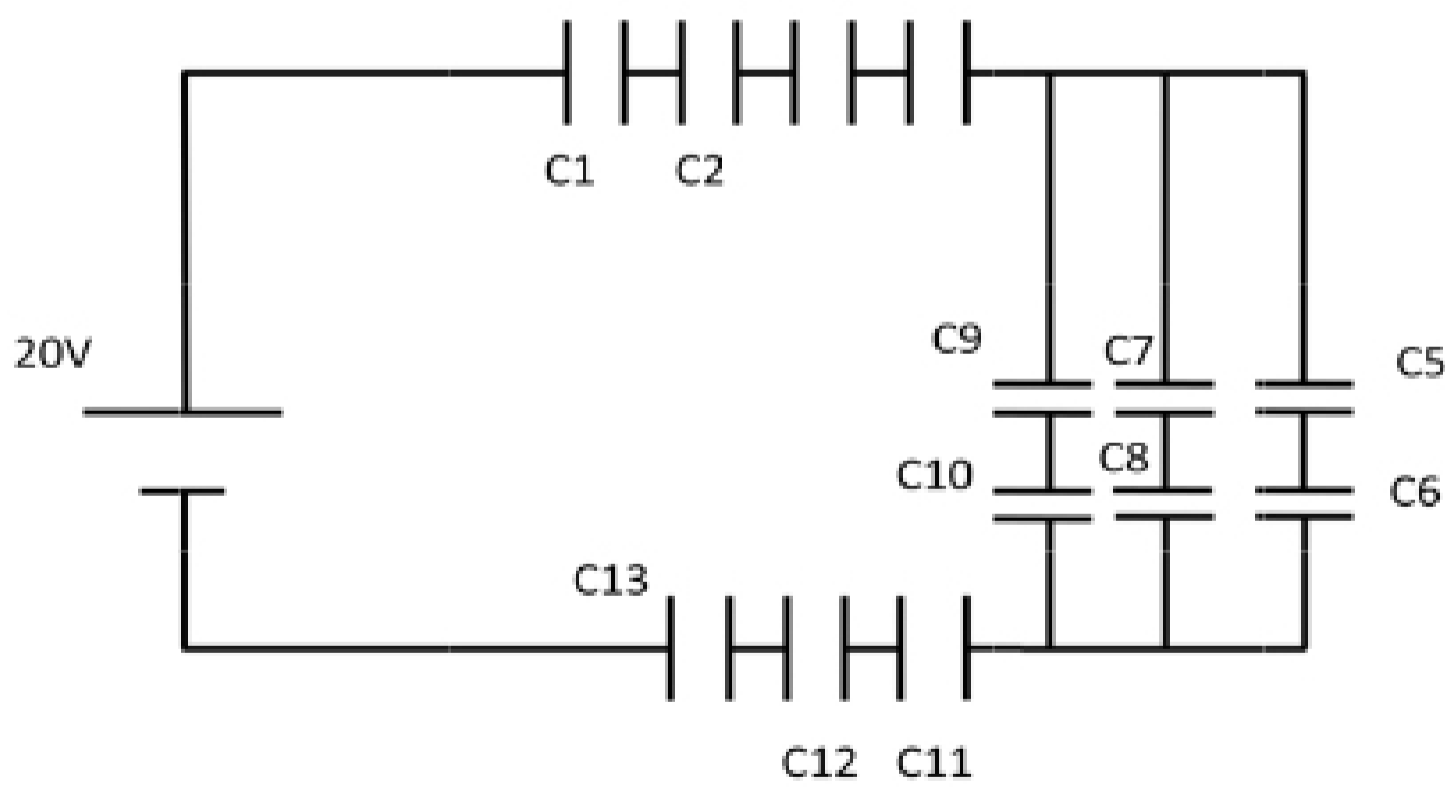
4) On the equipotential chart shown below:

a) Where is the electric field strongest?

b) What is the approximate magnitude of the electric field, at that point? The lines are 1 V apart.

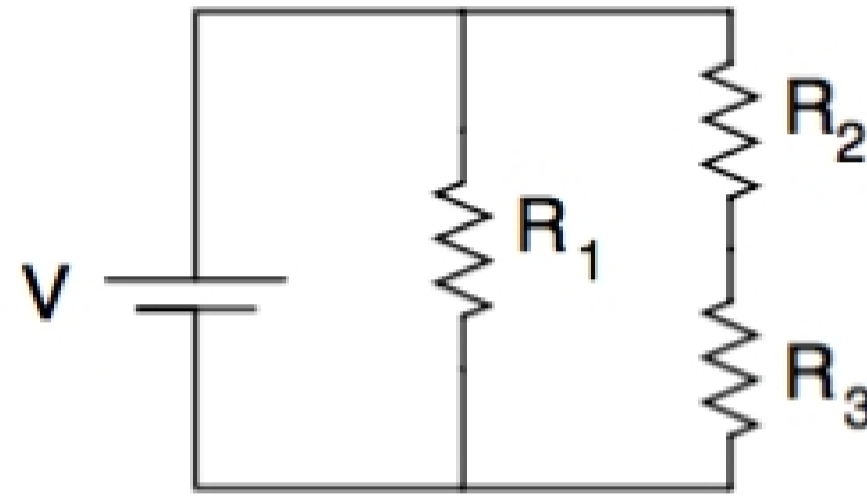


5) In the circuit below $C_1=3\mu\text{F}$, $C_2=8\mu\text{F}$, $C_3=2\mu\text{F}$, $C_4=3\mu\text{F}$, $C_5=9\mu\text{F}$, $C_6=3\mu\text{F}$, $C_7=1\mu\text{F}$, $C_8=3\mu\text{F}$, $C_9=5\mu\text{F}$, $C_{10}=11\mu\text{F}$, $C_{11}=4\mu\text{F}$, $C_{12}=7\mu\text{F}$, and $C_{13}=1\mu\text{F}$. What is the equivalent capacitance of all thirteen capacitors?



6) A cell containing two rectangular conducting plates immersed in salt water is shown below. The plates have height $H=77$ cm, width $W=12$ cm and are separated by a distance $D=2$ cm. The salt water was prepared by adding 5g of salt (Sodium Chloride, NaCl) to 2000 ml of Water. The molecular weight of Na (Sodium) is 23 amu and the molecular weight of CL (Chlorine) is 35.5 amu. Using information from the graph of conductivity vs. concentration, what will be the resistance of the cell?

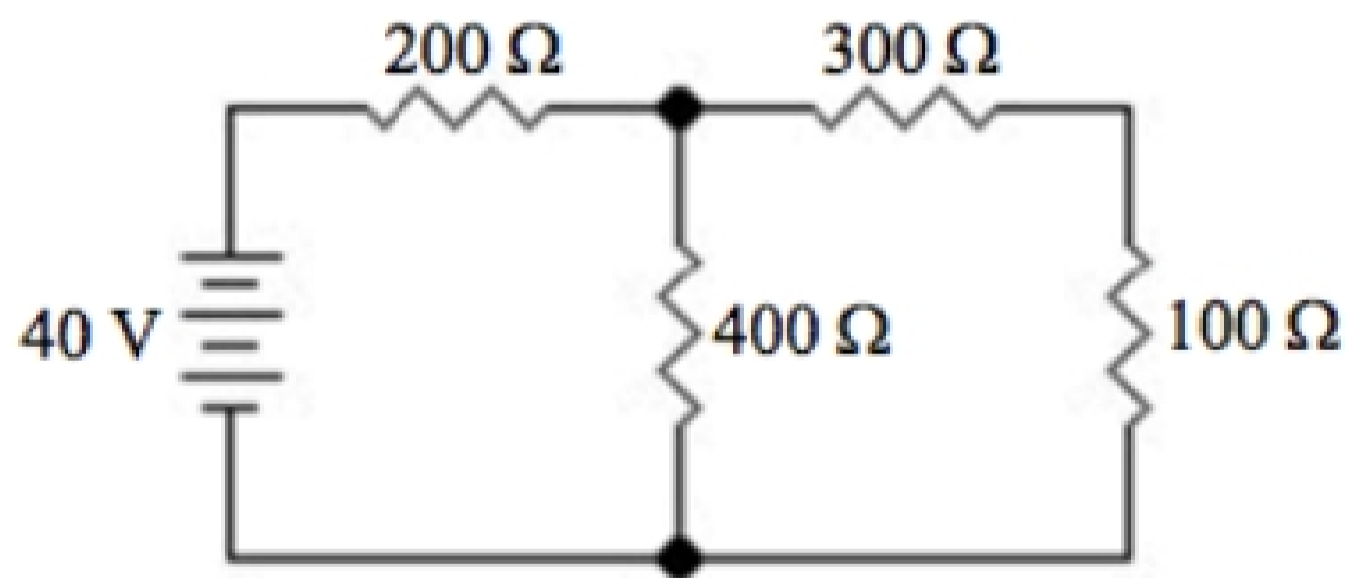
7) In the circuit shown, $V=5$ V, $R_1=3\Omega$, $R_2=5\Omega$, and $R_3=3\Omega$



How much current flows through R_3 ?

- A) 0.5 A
- B) 0.625 A
- C) 0.773 A
- D) 0.789 A
- E) 0.921 A

8) How much power is dissipated in the 200Ω resistor?



- A) 230 W
- B) 50 W
- C) 18 W
- D) 4 W
- E) 0.5 W