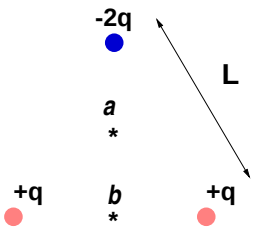
Pratt, Scott **Section 999**

–Introductory Physics II - EXAM 1 - Feb. 4, 1998

CAPA ID is **2159**



1. [3pt] Consider two positive charges q and a negative charge $-2q$ arranged in an equilateral triangle of length L as shown above. Point a is at the center of the triangle, while point b is at the midpoint of the lower leg. (For each statement select T True, F False).

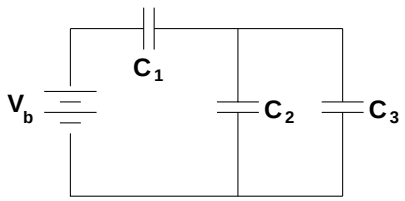
A) The electric potential at b is zero.

B) The electric field at a is zero.

C) The electric potential at a is zero.

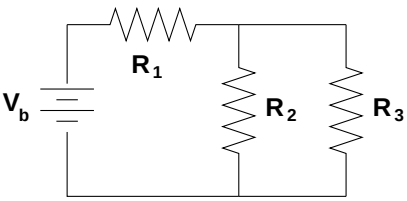
2. [3pt] Using the diagram above, find the magnitude of the electric field at point b in V/m. DATA: $q = 1.05 \times 10^{-9}$ C, $L = 1.0$ m.

A) 1.34×10^{1} B) 1.57×10^{1} C) 1.84×10^{1} D) 2.15×10^{1}
E) 2.52×10^{1} F) 2.95×10^{1} G) 3.45×10^{1} H) 4.03×10^{1}



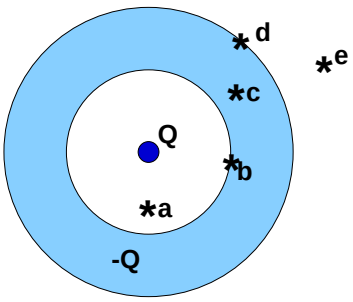
3. [3pt] Consider the circuit above. What is the charge (in μC) on C_1? DATA: $V_b = 6.0$ V, C_1 =7.0 μF, C_2 =1.8 μF, C_3 =1.8 μF. HINT: The charge on C_1 equals the charge drawn off the battery.

A) 4.59 B) 5.73 C) 7.17 D) 8.96
E) 1.12×10^{1} F) 1.40×10^{1} G) 1.75×10^{1} H) 2.19×10^{1}



4. [3pt] Consider the circuit above. What is the current (in *amps*) through R_3? DATA: $V_b = 6.0$ V, R_1 =13.0 Ω, R_2 =52.0 Ω, R_3 =52.0 Ω.

A) 1.61×10^{-2} B) 2.02×10^{-2} C) 2.52×10^{-2} D) 3.15×10^{-2}
E) 3.94×10^{-2} F) 4.92×10^{-2} G) 6.15×10^{-2} H) 7.69×10^{-2}



5. [3pt] Consider a spherical CONDUCTING shell of charge, $-Q$, with a point charge, $+Q$, placed at its center. (Give ALL correct answers, i.e., B, AC, BCD...)

A) The shell's negative charge lies entirely on the inner surface of the shell

B) The voltage at b equals the voltage at d.

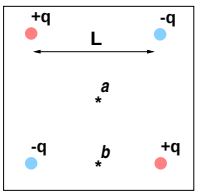
C) The electric field at e is zero.

6. [3pt] Reconsider the diagram above, assuming that the negative charge on the shell is distributed uniformly throughout the material that makes up the shell. (Give ALL correct answers, i.e., B, AC, BCD...)

A) The voltage at d equals the voltage at e.

B) The electric field at c is zero.

C) The electric field at e is zero.



7. [3pt] Consider two positive charges q and two negative charges $-q$ arranged in a square of length L. Point a is at the center of the square, while point b is at the midpoint of the lower leg. (Give ALL correct answers, i.e., B, AC, ...)

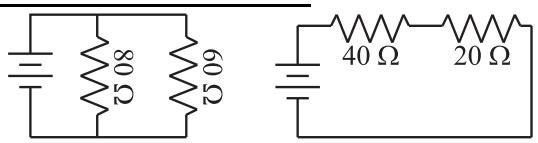
A) The electric field at a is zero.

B) The electric potential at a is zero.

C) The electric potential at b is zero.

8. [3pt] What is the work (in J) required to move one of the charges to infinity, while leaving the rest of the charges in place? DATA: $q = 1.05 \times 10^{-9}$ C, $L = 0.5$ m.

A) 1.57×10^{-8} B) 1.78×10^{-8} C) 2.01×10^{-8} D) 2.27×10^{-8}
E) 2.56×10^{-8} F) 2.90×10^{-8} G) 3.27×10^{-8} H) 3.70×10^{-8}



9. [3pt] Both batteries have a voltage of 14 V, what is the power (in W) lost as heat in the 20 Ω resistor?

A) 8.19×10^{-1} B) 1.09 C) 1.45 D) 1.93
E) 2.56 F) 3.41 G) 4.53 H) 6.03

10. [3pt] What is the power (in W) lost as heat in the 80 Ω resistor?

A) 8.03×10^{-1} B) 1.00 C) 1.25 D) 1.57
E) 1.96 F) 2.45 G) 3.06 H) 3.83