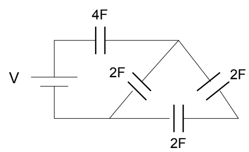

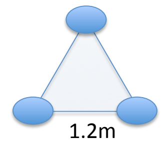

1B quiz 1 version A

1. A $2.5\mu C$ charge is placed at the center of a cube whose sides measure 10 cm. Find the electric flux going out the top face of the cube (hints: no integrals are necessary; use symmetry)
   - a. 4.7×10^4 V-m
   - b. 9.4×10^4 V-m
   - c. 9.4×10^6 V-m
   - d. 4.7×10^7 V-m
2. Find the equivalent capacitance (i.e. the ratio of total charge to battery voltage) for the circuit shown in the Figure above.
   - a. 1.25 F
   - b. 1.71 F
   - c. 4.7 F
   - d. 6.7 F
3. Two point charges are placed on the x-axis; a charge of +3 μC at $x = 0$ and a charge of -2 μC at $x = .5m$. Which of the following is true about the positions at which the electric potential is zero?
   - a. The potential zero is zero at only one point; the point lies on the x axis and is between the two charges
   - b. The potential zero is zero at only one point; the point lies on the x axis and is not between the two charges

- c. The potential zero is zero along a curve in the x-y plane that intersects the x-axis at a single point that is between the two charges
- d. The potential zero is zero along a curve in the x-y plane that intersects the x-axis at a two points, one that is between the two charges and one that is not between the two charges

4. How strong is the electric field between the plates of a .8 μF capacitor, if the plates are 2.0 mm apart, the gap is filled with air, and plate each has a charge of 72 μC?

- a. 90 N/C
- b. 4.5 $\times 10^4$ N/C
- c. 7.5 N/C
- d. .18 N/C

5. An electron starts with a kinetic energy of 1 kev from a position 25 cm away from a fixed point charge of magnitude $q = -0.125\mu C$. How fast will it be moving when it is very far away? The mass of the electron is 9.1×10^{-31} kg and its charge is $-1.6 \times 10^{-16} C$

- a. 4.4 $\times 10^7$ m/s
- b. 3.5 $\times 10^7$ m/s
- c. 7.6 $\times 10^6$ m/s
- d. 3.1 $\times 10^6$ m/s

6. Three equal charges with $q = 4.0\mu C$ are placed on the vertices of an equilateral triangle with side $1.2m$ (see figure). What is the force on the topmost charge?

- a. 2.1 $\times 10^{-1}$ N $(.5\hat{\imath} + .87\hat{\jmath})$
- b. 8.8 $\times 10^{-2}$ N $\hat{\jmath}$
- c. 1.7 $\times 10^{-1}$ N $\hat{\imath}$
- d. 1.7 $\times 10^{-1}$ N $\hat{\jmath}$

7. An electron is released from rest in a uniform electric field and accelerates to the north at a rate of $115m/s^2$. The mass of the electron is 9.1×10^{-31} kg and its charge is $-1.6 \times 10^{-16}C$ What is the electric field?

   - a. 6.5 $\times 10^{-13}$ N/C, pointing north
   - b. 6.5 $\times 10^{-13}$ N/C, pointing south
   - c. 2.6 $\times 10^{-12}$ N/C, pointing north
   - d. 2.6 $\times 10^{-12}$ N/C, pointing south

8. A solid metal sphere of radius 3.0 m carries a charge of 3.5 mC. What is the magnitude of the electric field at $r = 2.9m$ and $r = 3.1m$ away from the sphere's center?

   - a. 0 and 0
   - b. 3.0 $\times 10^6$ N/C and 3.3 $\times 10^6$ N/C
   - c. 0 and 3.3 $\times 10^6$ N/C
   - d. 3.0 $\times 10^6$ N/C and 0 N/C