

**(Sheet # 2) – Part [1] – Electrostatic Force**

Q1: **Compute** the electrostatic force between two charges of  $5 \times 10^{-9} \text{ C}$  and  $-3 \times 10^{-8} \text{ C}$  which are separated by  $d = 10 \text{ cm}$

Q2: Two metallic spheres located at distance of  $d = 5 \text{ cm}$  attract one another with force of  $F = 3 \text{ mN}$ . If one of them has three times more charges than the other. **Determine** the charge value of the two spheres

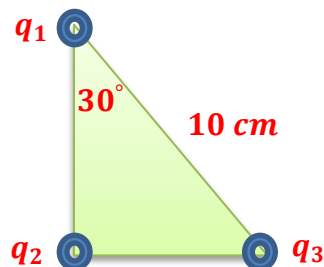
Q3: A particle of charge  $-40 \mu\text{C}$  is located on  $y$  - *axis* at the point  $y = 20 \text{ m}$  and the second particle of charge  $20 \mu\text{C}$  is placed on  $x$  - *axis* at  $x = 30 \text{ m}$ . **Determine** the total electrostatic force on a third particle of charge  $-10.0 \mu\text{C}$  placed at the origin

Q4: A point charge  $q_1 = 2 \mu\text{C}$  located at origin and another point charge  $q_2 = -5 \mu\text{C}$  is on the coordinate  $(x = 3, y = 4) \text{ m}$

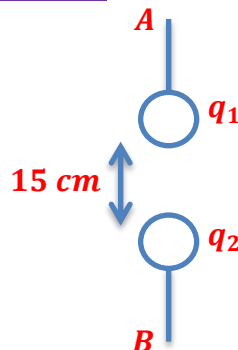
**Determine:**

- A. The electrostatic force on charge  $q_1$
- B. State that this force is attractive or repulsive

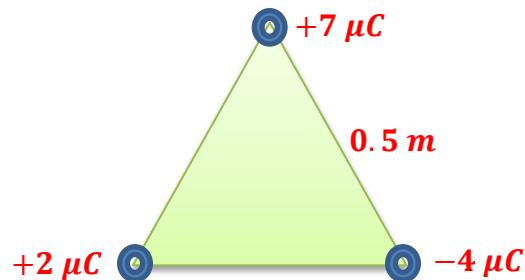
Q5: Three point charges are fixed in place in the right angle triangle shown below, in which  $q_1 = 0.71 \mu\text{C}$  and  $q_2 = -0.67 \mu\text{C}$ . **Determine** magnitude and direction of the electrostatic force on the  $+1.0 \mu\text{C}$  (let's call this  $q_3$ ) charge due to the other two charges



Q6: Two small insulating spheres are attached to silk threads and aligned vertically as shown in the below figure for stationary position. These spheres have equal masses of  $40 \text{ g}$  and carry charges  $q_1$  and  $q_2$  of equal magnitude  $2.0 \mu\text{C}$  but opposite sign. The spheres are brought into the positions shown in the figure, with a vertical separation of  $15 \text{ cm}$  between them. Note that you cannot neglect gravity. **Determine** the tension in the lower threads

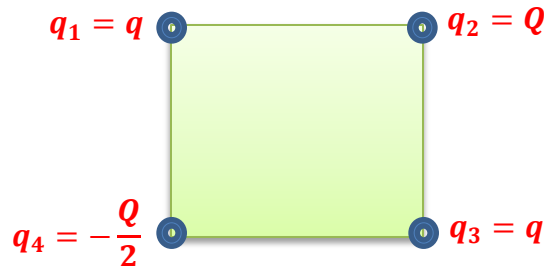


**(Report Section) Q7:** Three point charges are located at corners of an equilateral triangle as shown below. Determine magnitude and direction of net electrostatic force on  $7 \mu\text{C}$  charge



**Q8:** An electron is fixed at position  $x = 0$  and a second charge  $q$  is fixed at  $x = 4 \times 10^{-9} \text{ m}$  (to the right). A proton is now placed between the two at  $x' = 1 \times 10^{-9} \text{ m}$ . Determine the charge  $q$  be (magnitude and sign) so that the proton is in equilibrium

**Q9:** Four point charges are located on the corners of a square shown in the below figure. If the net Coulomb force on  $q_2$  is zero. Determine is the ratio of  $Q/q$



**Q10:** Two point charges  $q_1 = +2 \mu\text{C}$  and  $q_2 = +8 \mu\text{C}$  are  $30 \text{ cm}$  apart from each other. Extra charge  $q$  is placed so that three charges are brought to a balance. Determine the location of the charge  $q$

**(Report Section) Q11:** Two point charges are given as  $q_1 = +2 \mu\text{C}$  and  $q_2 = -8 \mu\text{C}$  are at distance  $d = 10 \text{ cm}$ . Determine the position of a third charge  $q_3$  to be placed so that net Coulomb force acted upon it is zero

End of Sheet

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