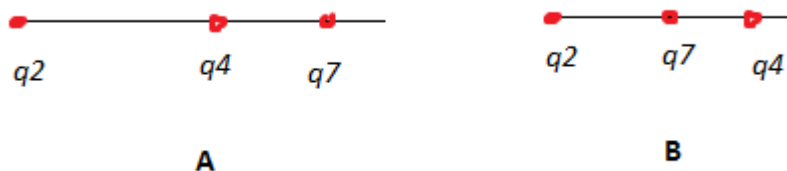


## Answer on Question #62123

what is the total electric force on  $-2\text{nC}$  charge?  $q_4 = -4\text{nC}$ ,  $q_2 = -2\text{nC}$ ,  $q_7 = 7\text{nC}$ , the distance between  $q_2$  and  $q_4$  is  $0.12\text{mm}$  and the distance between  $q_4$  and  $q_7$  is  $0.05\text{mm}$ .

### Solution

Two situations are possible they are shown on the next figure:



The resulting force on the charge  $q_2$  depends on the distance between  $q_2$  and  $q_2$ , so we need consider two situations:

A) Distance between  $q_2$  and  $q_7$  is  $r = 0.12 + 0.05 = 0.17\text{mm}$

The force is:

$$F = \frac{kq_2q_4}{r_{24}^2} + \frac{kq_2q_7}{r_{27}^2} = 9 * 10^9 \left( \frac{-2 * (-4) * 10^{-18}}{120^2 * 10^{-18}} + \frac{-2 * 7 * 10^{-18}}{170^2 * 10^{-18}} \right)$$
$$= 9 * 10^5 (5.56 - 4.84) = 6.44 * 10^5 \text{Newton}$$

B) Distance between  $q_2$  and  $q_7$  is  $r = 0.12 - 0.05 = 0.07\text{mm}$

The force is:

$$F = \frac{kq_2q_4}{r_{24}^2} + \frac{kq_2q_7}{r_{27}^2} = 9 * 10^9 \left( \frac{-2 * (-4) * 10^{-18}}{120^2 * 10^{-18}} + \frac{-2 * 7 * 10^{-18}}{70^2 * 10^{-18}} \right)$$
$$= 9 * 10^5 (5.56 - 28.57) = -2.07 * 10^7 \text{Newton}$$

### Answer

(see fig.)

A)  $F = 6.44 * 10^5 \text{Newton}$

B)  $F = -2.07 * 10^7 \text{Newton}$