

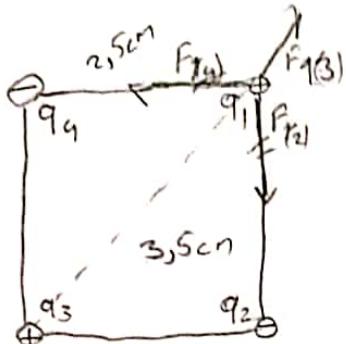
$$\textcircled{1} \quad \vec{F} = k \cdot \frac{q_1 \cdot q_2}{r^2}$$

$$q_1 = +4.53 \times 10^{-6} \text{ C}$$

$$q_3 = +7.53 \times 10^{-6} \text{ C}$$

$$q_2 = -5.53 \times 10^{-6} \text{ C}$$

$$q_4 = -5.53 \times 10^{-6} \text{ C}$$

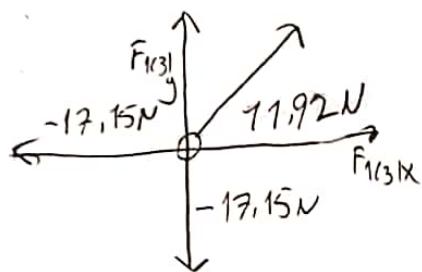


$$\vec{F}_1$$

$$F_{1(2)} = 9 \cdot 10^9 \cdot \frac{(4,53 \cdot 10^{-6}) \cdot (-5,53 \cdot 10^{-6})}{(0,025)^2} = -17,15 \text{ N}$$

$$F_{1(4)} = 17,15 \text{ N}$$

$$F_{1(3)} = 9 \cdot 10^9 \cdot \frac{(4,53 \cdot 10^{-6}) \cdot (7,53 \cdot 10^{-6})}{(0,035)^2} = 11,92 \text{ N}$$



$$F_{1(3)x} = F_{1(3)} \cdot \cos 45^\circ = 11,92 \cdot \frac{\sqrt{2}}{2} = 8,43 \text{ N}$$

$$F_{1(3)y} = F_{1(3)} \cdot \sin 45^\circ = 11,92 \cdot \frac{\sqrt{2}}{2} = 8,43 \text{ N}$$

$$\sum F_{Netx} = 8,43 + (-17,15)$$

$$\sum F_{Netx} = -8,72 \text{ N}$$

$$\sum F_{Nety} = 8,43 + (-17,15)$$

$$\sum F_{Nety} = -8,72 \text{ N}$$

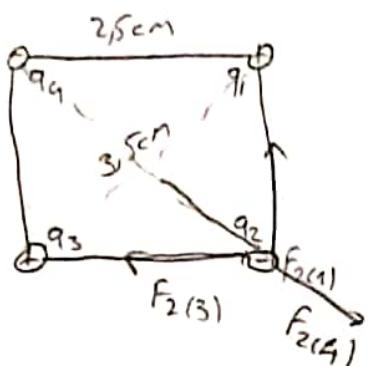
$$|F_{Net}| = \sqrt{(-8,72)^2 + (-8,72)^2}$$

$$F_{1,Net} = 67,32 \text{ N}$$

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 \vec{F}_2

$$F_{2(1)} = 9 \cdot 10^9 \frac{(-5,53 \cdot 10^{-6}) \cdot (4,53 \cdot 10^{-6})}{(0,025)^2}$$

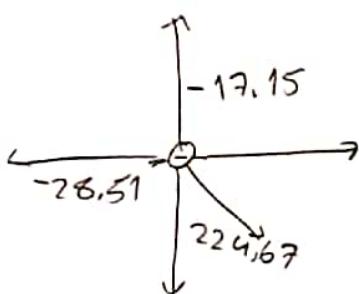
$$= -17,15 \text{ N}$$

$$F_{2(3)} = 9 \cdot 10^9 \frac{(-5,53 \cdot 10^{-6}) \cdot (7,53 \cdot 10^{-6})}{(0,025)^2}$$

$$= -28,51 \text{ N}$$

$$F_{2(4)} = 9 \cdot 10^9 \frac{(-5,53 \cdot 10^{-6}) \cdot (-5,53 \cdot 10^{-6})}{(0,035)^2}$$

$$= 10,68 \text{ N}$$



$$F_{2(4)x} = F_{2(4)} \cos 45^\circ = 10,68 \cdot \frac{\sqrt{2}}{2} = 7,55 \text{ N}$$

$$F_{2(4)y} = F_{2(4)} \sin 45^\circ = 10,68 \cdot \frac{\sqrt{2}}{2} = 7,55 \text{ N}$$

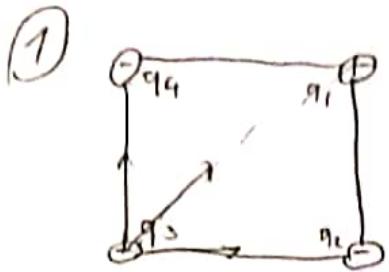
$$\leq F_{\text{Net}x} = 158,87 + (-17,15) = -9,6 \text{ N}$$

$$\leq F_{\text{Net}y} = 158,87 + (-28,51) = -20,96 \text{ N}$$

$$|F_{\text{Net}}| = \sqrt{(-9,6)^2 + (-20,96)^2}$$

$$F_{\text{Net}} = 71,2 \text{ N}$$

Altıg Ege Sarı 180259053



F_3

$$F_{3(1)} = 9,10^9 \cdot \frac{(7,53 \times 10^{-6}) \cdot (4,53 \times 10^{-6})}{(0,035)^2}$$

$$= 11,92 \text{ N}$$

$$F_{3(2)} = 9,10^9 \frac{(7,53 \times 10^{-6}) \cdot (-5,53 \times 10^{-6})}{(0,025)^2}$$

$$= -28,51 \text{ N}$$

$$F_{3(4)} = -28,51 \text{ N}$$

$$F_{3(1)x} = F_{3(1)} \cdot \cos 45^\circ = 11,92 \times \frac{\sqrt{2}}{2} = 8,43 \text{ N}$$

$$F_{3(1)y} = F_{3(1)} \cdot \sin 45^\circ = 11,92 \times \frac{\sqrt{2}}{2} = 8,43 \text{ N}$$

$$F_{Net,x} = 8,43 + (-28,51) = -20,08 \text{ N}$$

$$F_{Net,y} = 8,43 + (-28,51) = -20,08 \text{ N}$$

$$|F_{Net}| = \sqrt{(-20,08)^2 + (-20,08)^2}$$

$$F_{3Net} = 383,13 \text{ N}$$

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 F_4

$$F_{4(1)} = 9,10^9 \frac{(-5,53 \times 10^{-6}) \cdot (4,53 \times 10^{-6})}{(0,025)^2}$$

$$= -17,15 N$$

$$F_{4(3)} = 9,10^9 \frac{(-5,53 \times 10^{-6}) \cdot (7,53 \times 10^{-6})}{(0,025)^2}$$

$$= -28,51 N$$

$$F_{4(2)} = 9,10^9 \frac{(-5,53 \times 10^{-6}) \cdot (-5,53 \times 10^{-6})}{(0,035)^2}$$

$$= 0,68 N$$

$$F_{4(2)x} = 7,55 \times \frac{\sqrt{2}}{2} = 7,55 N \quad F_{4(2)y} = 7,55 N$$

$$\sum F_{\text{Free},x} = 7,55 + (-17,15) = -9,6 N$$

$$\sum F_{\text{Free},y} = 7,55 + (-28,51) = -20,96 N$$

$$|F_{\text{Free},\text{tot}}| = \sqrt{(-9,6)^2 + (-20,96)^2}$$

$$F_{\text{max},t} = 21,2 N$$

Ahmet Ege Sancı
180254053