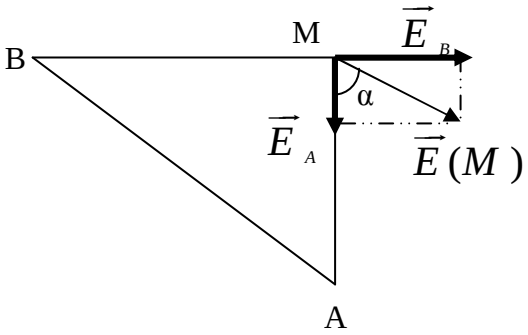
حل التمرين 05

.1



$$\vec{E}_A = k\frac{q_1}{AM^2}\vec{u}_{AM} \qquad \vec{E}_B = k\frac{q_2}{BM^2}\vec{u}_{BM}$$

$$\vec{E} = \vec{E}_A + \vec{E}_B$$

$$E^2 = k^2\frac{q_1^2}{AM^4} + k^2\frac{q_2^2}{BM^4}$$

$$E = k\sqrt{\frac{q_1^2}{AM^4} + \frac{q_2^2}{BM^4}}$$

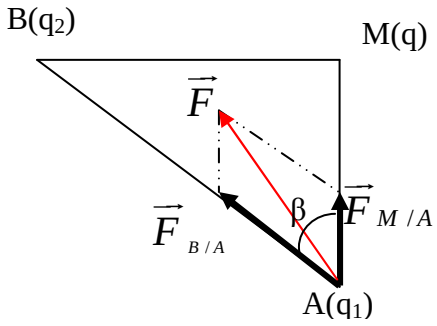
تطبيق عددي :

$$E = 9.10^9\sqrt{\frac{(10.10^{-9})^2}{(3.10^{-2})^4} + \frac{(40.10^{-9})^2}{(4.10^{-2})^4}}$$

$$E = 2,5.10^5\ V.m^{-1}$$

$$\cos\alpha = \frac{E_A}{E} \Rightarrow \cos\alpha = \frac{\frac{k|q_1|}{AM^2}}{E} = \frac{k|q_1|}{E\times AM^2}$$

$$\cos\alpha = 0,4 \Rightarrow \alpha = 66,4°$$



.2

$$\vec{F} = q\vec{E} \Rightarrow F = qE$$

تطبيق عددي : $F = 2,5.10^{-4}N$

.3

$$\vec{F} = \vec{F}_{B/A} + \vec{F}_{M/A}$$

$$\vec{F} = k\frac{q_1q_2}{AB^2}\vec{u}_{BA} + k\frac{q_1q}{AM^2}\vec{u}_{MA}$$

$$F^2 = k^2\frac{(q_1q_2)^2}{AB^4} + k^2\frac{(q_1q)^2}{AM^4} + 2k^2\frac{q_1^2qq_2}{AB^2.AM^2}\cos\beta$$

$$F = k|q_1|\sqrt{\frac{q_2^2}{AB^4} + \frac{q^2}{AM^4} + 2\frac{qq_2}{AB^2.AM^2}\cos\beta}$$

$$F = 2,2.10^{-6}N$$