

3) Le potentiel $V(E)$ crée par ces 4 charges au point E milieu de AB : $AE = EB$

$$V(E) = V_A + V_B + V_C + V_D$$

$$= \frac{kq_A}{(AE)} + \frac{kq_B}{(EB)} + \frac{kq_C}{ED} + \frac{kq_D}{ED}$$

$$= \frac{kq_A}{\frac{a}{\sqrt{2}}} + \frac{kq_B}{\frac{a}{\sqrt{2}}} + \frac{kq_C}{\sqrt{5}a} + \frac{kq_D}{\sqrt{5}a}$$

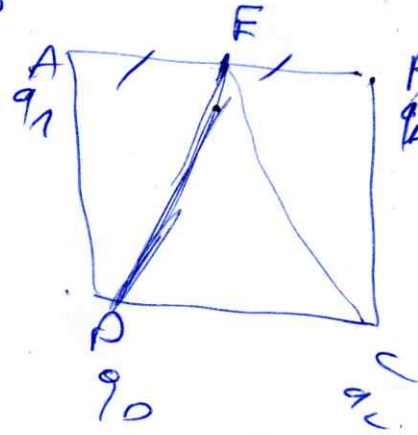
$$= \frac{2k}{a} \left(q_A + q_B + \frac{q_C}{\sqrt{5}} + \frac{q_D}{\sqrt{5}} \right)$$

$$= \frac{2 \times 10^{-9}}{2} \left(2 \times 10^{-8} - 8 \times 10^{-8} + \frac{2 \times 10^{-8}}{\sqrt{5}} + \frac{4 \times 10^{-8}}{\sqrt{5}} \right)$$

$$V(E) = -298,5 \text{ V}$$

4) La force électrostatique $\vec{F}(0)$:

$$\vec{F}(0) = q \vec{E}(0) = 2 \times 10^{-8} (540 \vec{j}) = 1080 \vec{j} \cdot 10^{-8} \text{ (N)}$$



$$ED = EC =$$

$$\left(\frac{a}{\sqrt{2}}\right)^2 + a^2 =$$

$$\frac{a^2}{4} + a^2 = \frac{5a^2}{4}$$

$$= \frac{\sqrt{5}a}{2}$$