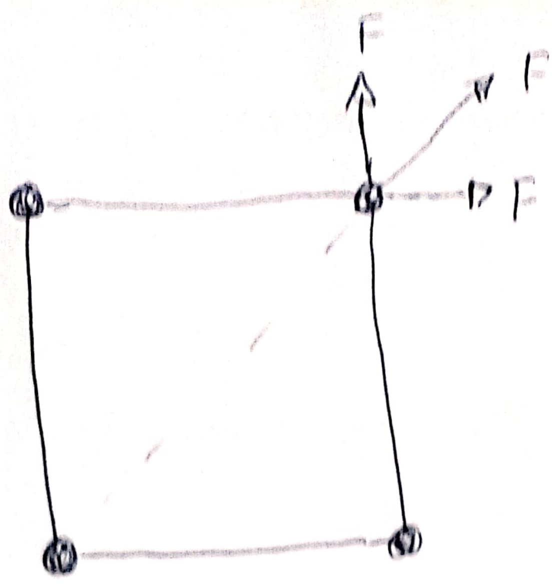
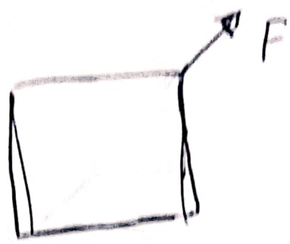
1.-

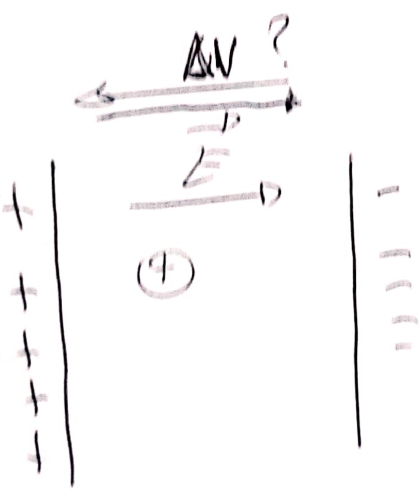


F e F son iguais
si compoñemos as forzas
danos unha resultante



hai unha aceleración, ainda que cando se alonxa a aceleración diminue, sigue acelerandose, polo tanto a resposta é a d

2.-

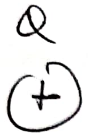


$\Delta V = -\vec{E}\,\Delta r$

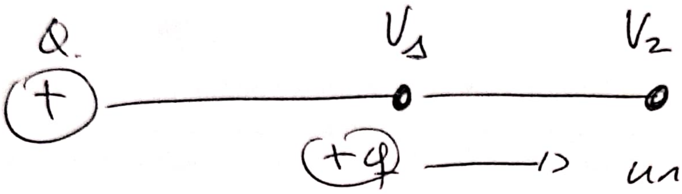
V

Non se consigue nada!

2.- Outra forma de plantexalo



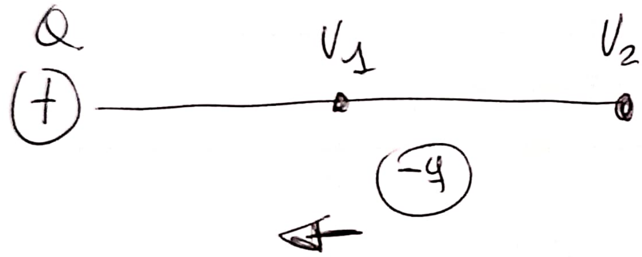
potencial creado por unha carga positiva



unha carga positiva iría de $V_1 \rightarrow V_2$
REPELESE.

$V_2 < V_1$

Pero unha carga negativa



$V_1 > V_2$

movese cara o potencial creciente.

Se a carga que crea o campo fose negativa?

$V_2 > V_1$

$V = -K \frac{Q}{r}$

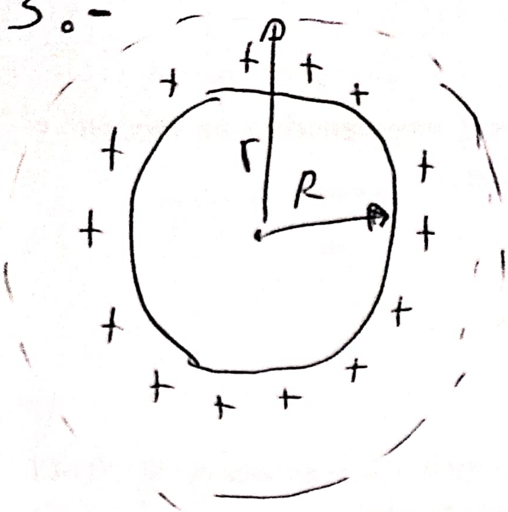
$V_2 = -K \frac{Q}{r_2}$

$V_1 = -K \frac{Q}{r_1}$

$|V_1| > |V_2|$ peso $V_2 > V_1$

solucion a)

3.-



Th. Gauss

$$\oint_S \vec{E}\cdot d\vec{S} = \frac{Q_e}{\varepsilon}$$

para $r<R$.

$$Q_e = 0$$

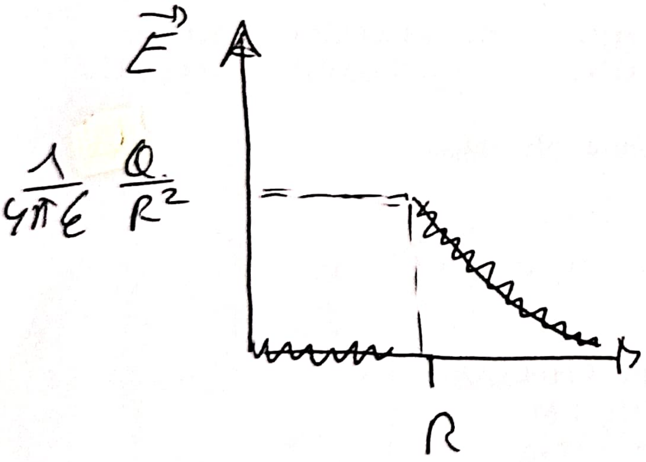
$$\oint \vec{E}\cdot d\vec{S} = 0 \Rightarrow \vec{E} = 0$$

para $r>R$.

$$|\vec{E}|\cdot 4\pi r^2 = \frac{Q}{\varepsilon_0} \Rightarrow |\vec{E}| = \frac{Q}{4\pi\varepsilon_0 r^2}$$

$$|\vec{E}| = \frac{1}{4\pi\varepsilon_0}\frac{Q}{r^2} \; ; \; |\vec{E}| = K\frac{Q}{r^2}$$

para $r=R$. $|\vec{E}| = K\frac{Q}{R^2}$; $|\vec{E}| = \frac{1}{4\pi\varepsilon_0}\frac{Q}{R^2}$

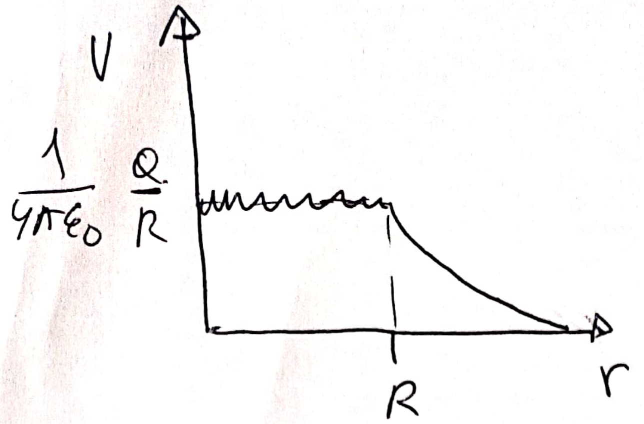


$\Delta V = -\vec{E}\,\Delta\vec{r}$; si $\Delta V = 0$ V = e constante

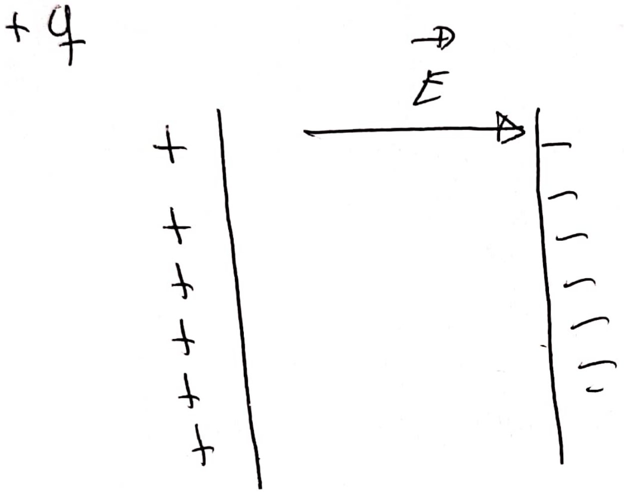
$V = \frac{1}{4\pi\varepsilon_0}\frac{Q}{R}$ para $r=R$ $V = \frac{1}{4\pi\varepsilon_0}\frac{Q}{R}$.

para $r<R \Rightarrow$ como tor que ser constante

$$V = \frac{1}{4\pi\varepsilon_0}\frac{Q}{R}$$



4.-



$\Delta V = -\vec{E} \cdot \Delta\vec{r}$; $\Delta V = -$

$\Delta E_p = q\,\Delta V$

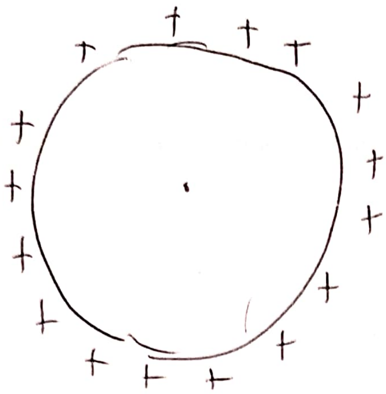
$(+)$ $\quad -$

$\Delta E_p = -$

Sentido contrario o campo eléctrico.

b)

5.-



equilibrio electrostático
a carga colocase o mais
afastada posible, polo
tanto, sobre a super
ficie da esfera.

$$\oint \vec{E}\, d\vec{s} = \frac{Q_{encerrada}}{\varepsilon}$$

$$E \cdot 4\pi r^2 = \frac{Q_e}{\varepsilon_0} \Rightarrow E = \frac{Q}{4\pi\varepsilon_0 r^2} = \frac{1}{4\pi\varepsilon_0}\frac{Q}{r^2}$$

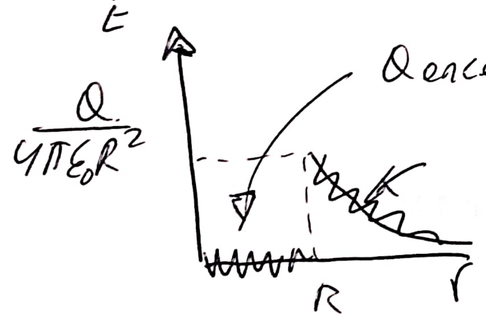
$$E = K\frac{Q}{r^2};$$

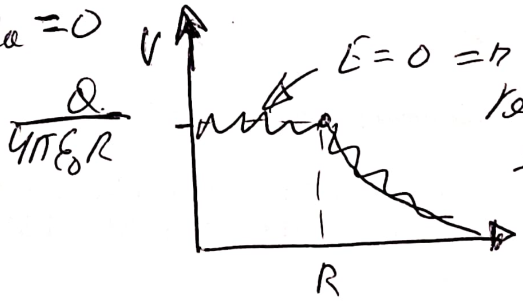
$$\Delta V = \vec{E}\cdot\Delta\vec{r}; \quad V = K\frac{Q}{r}; \quad V = \frac{Q}{4\pi\varepsilon_0 r}$$

para a superficie da esfera $|\vec{E}| = \frac{Q}{4\pi\varepsilon_0 R^2}$ e $V = \frac{Q}{4\pi\varepsilon_0 R}$

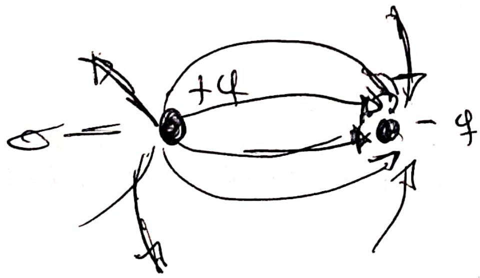
$\Delta V = \vec{E}\cdot\Delta\vec{r} \Rightarrow$ si $E = 0$ no interior da esfera

$$\Delta V = 0 \Rightarrow V = \frac{Q}{4\pi\varepsilon_0 R}$$



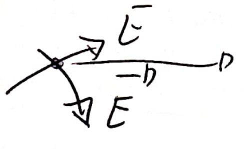


6.-



a) teñen fontes e sumidoiros
Non son pechadas. FALSA.

c)



neste punto habería dous valores
do campo FALSA

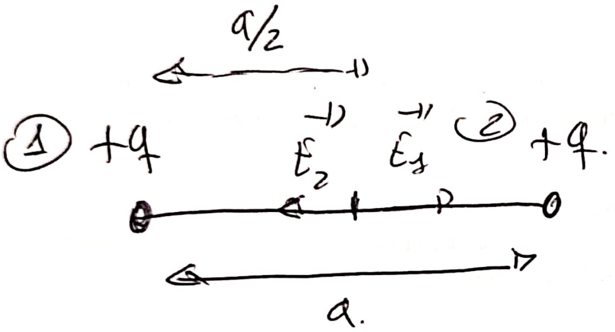
7.-

$$E_p = K\frac{q_1 q_2}{r^2}$$

$r\downarrow \Rightarrow E_p\uparrow$ a)

8.-

$$\oint \vec{E}\cdot d\vec{S} = \frac{Q_{encerrado}}{\varepsilon}$$ b)



$|\vec{E}_2| = |\vec{E}_1|$ en $a/2$ $\vec{E}_{TOTAL} = 0$

$$V = V_1 + V_2 = K\frac{q}{a/2} + K\frac{q}{\frac{a}{2}} = 4K\frac{q}{a}$$

b)

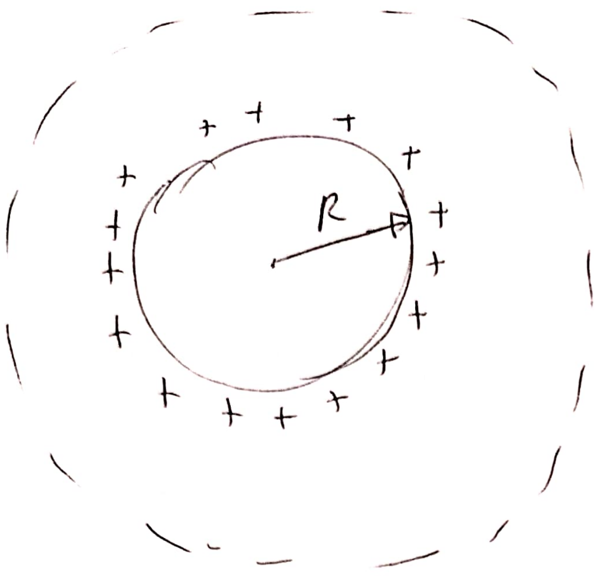
10.-

superficie equipotencial $V = cte \Rightarrow V_1 = V_2$

$$W = -\Delta E_p = -q(\underbrace{V_2 - V_1}_{0}) \Rightarrow W = 0$$

a)

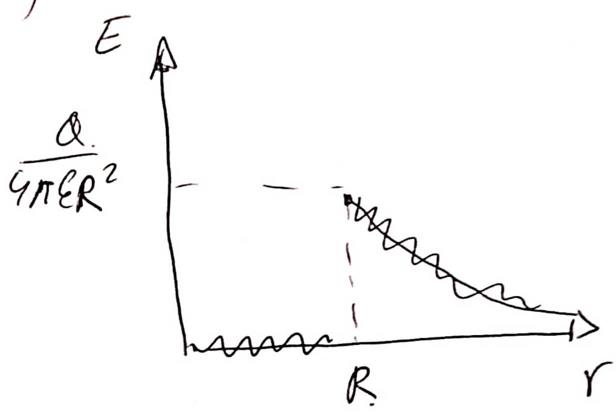
11.-



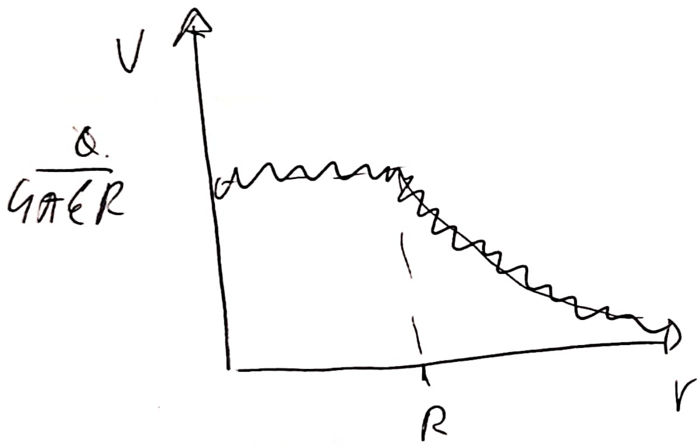
$$\oint \vec{E}\cdot d\vec{S} = \frac{Q_{en.}}{\varepsilon}$$

$$E\,4\pi r^2 = \frac{Q}{\varepsilon}$$

$$|\vec{E}| = \frac{Q}{4\pi\varepsilon r^2}$$



$$\Delta V = \vec{E}\,\Delta\vec{r}$$



12.-

Razoamento igual que o anterior

a)

13.-

$V_\infty = 0$

$V_P = 0$

$$W_\infty^P = -q'(V_P - V_\infty)$$

$$\Downarrow$$

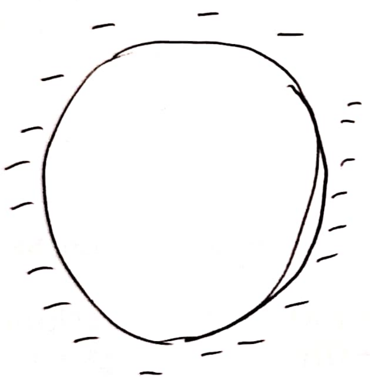
$$0$$

$$W_\infty^P = 0$$

c)

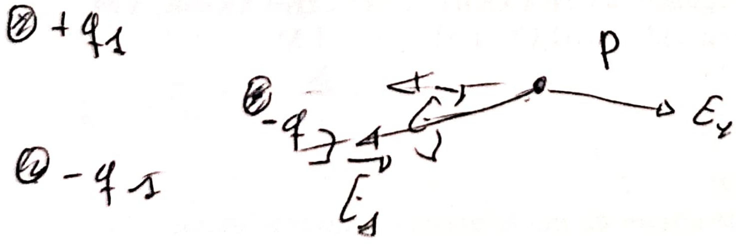
14.-

a)



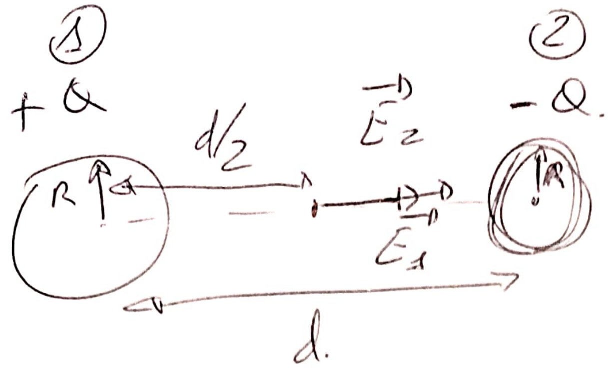
a carga distribúese por todo o conductor, xa que tende estar o máis lonxe posible. Ten o mesmo signo e repélese

15.-



a)

16.-



$d/2 \gg R$ implica cargas puntuais

en $d/2$ potencial cero.

No punto medio

$$V_1 = K \frac{Q}{d/2} \quad ; \quad V_2 = -K \frac{Q}{d/2} \Rightarrow V_{TOTAL} = 0$$

$$\vec{E}_1 = K \frac{Q}{(d/2)^2} \vec{i} \quad ; \quad \vec{E}_2 = -K \frac{Q}{(d/2)^2} \vec{i}$$

$$|\vec{E}|_{TOTAL} = 8K \frac{Q}{d^2}$$

b)

17.-

$m_1 = m_2 = 1\,Kg$

$q_1 = q_2 = 1\,C.$

$$F_G = 6'67 \cdot 10^{-11} \frac{N \cdot m^2}{Kg^2} \frac{1Kg \cdot 1Kg}{(1m)^2} = 6'67 \cdot 10^{-11} N$$

$$F_E = 9 \cdot 10^9 \frac{N \cdot m^2}{C^2} \frac{1C \cdot 1C}{(1m)^2} = 9 \cdot 10^9 N$$

a) Falsa

b) Falsa

c) son as duas conservativas

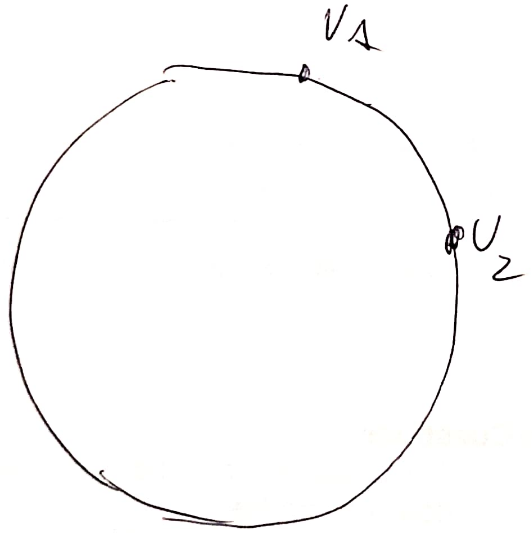
O traballo non depende da traxectoria seguido $\Rightarrow W = -\Delta E_p$

18.-

a carga repártese entre as duas esferas e o potencial ~~iguálase~~ (iguálase).

A resposta é a b)

19.-

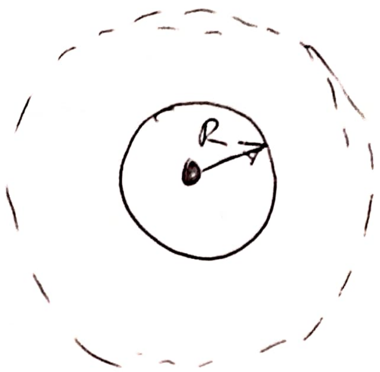


$V_1 = V_2$

teñen o mesmo potencial.

c)

20.-



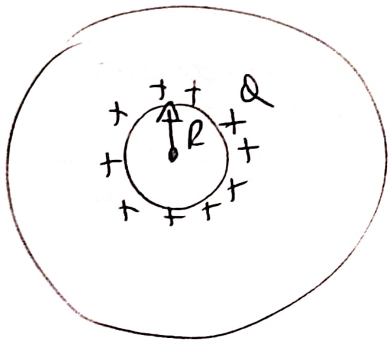
$$\oint \vec{E} \cdot d\vec{s} = \frac{Q}{\varepsilon_0}$$

$$\Phi = \oint \vec{E} \cdot d\vec{s}$$

flujo

b) $\frac{Q}{4\pi\varepsilon_0 r^2}$

21.-



$$\oint \vec{E} \cdot d\vec{s} = \frac{Qe}{\varepsilon}$$

$$E \cdot 4\pi r^2 = \frac{Q}{\varepsilon}$$

$$E = \frac{Q}{4\pi\varepsilon r^2} \Rightarrow E = \frac{1}{4\pi\varepsilon} \frac{Q}{r^2}$$

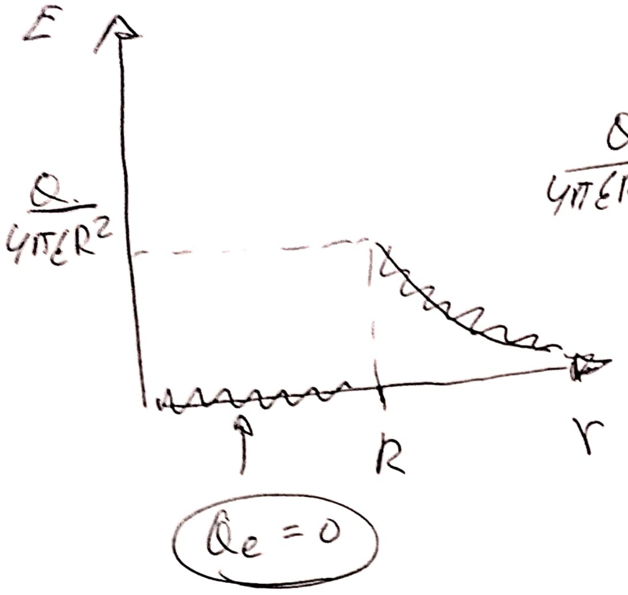
$$E = k \frac{Q}{r^2}$$

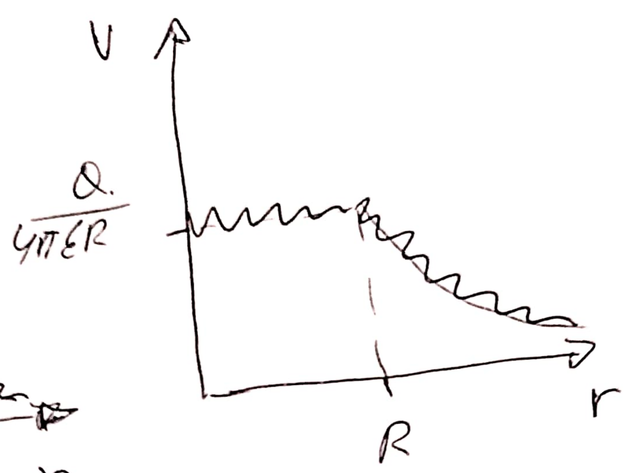
$$\Delta V = \vec{E} \Delta \vec{r} \qquad V = \frac{Q}{4\pi\varepsilon r}$$

↳ si $E = 0 \Rightarrow \Delta V = 0$

$V = \frac{Q}{4\pi\varepsilon R}$ para $r < R$ $\underline{V = \frac{Q}{4\pi\varepsilon R}}$

para que $\Delta V = 0$





c)

22.-

a)

a c) e falsa a carga tende a estar o
máis lonxe posible, repelese.

23.-

c)