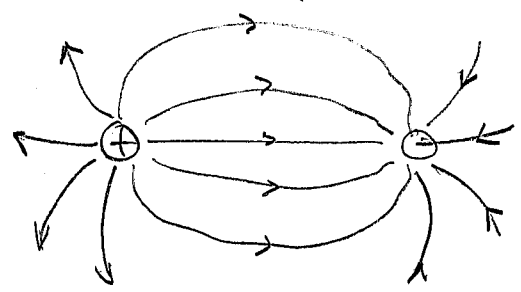


Elstat - dm - dz 7

**ODGOVORI**

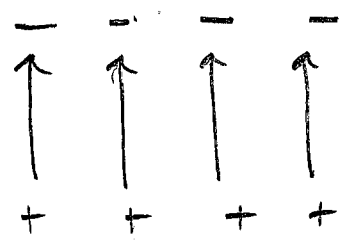
1.

D



dipol

E



ploščasti kondenzator

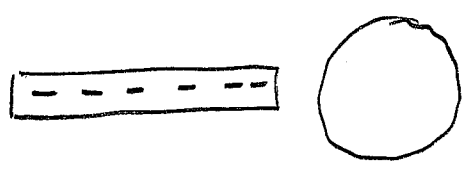
2.

E

3.

ima ju enak predznak; Za karakter električne sile (odbojnost ili privlačnost) bitan je predznak naboja.

4.



neutralna kuglica



influenca i privlačnost

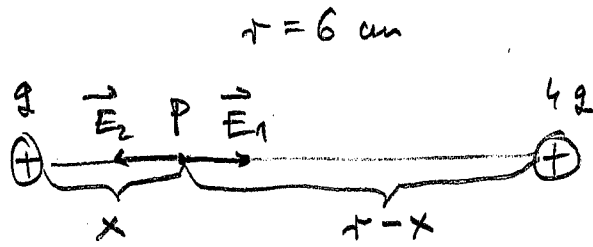
"neutralizacija" dodikom



odbojnost

↓  
Naboj na stopu prije i poslije dodira ima jednak predznak.

5.



$E_P = 0$   
 $x = ?$

$\vec{E}_1$  el. polje nalazi se q u točki P  
 $\vec{E}_2$  -||- 4q -||-

$\vec{E}_1 + \vec{E}_2 = \vec{0}$

$E_1 = E_2$

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

$k \cdot \frac{q}{x^2} = k \cdot \frac{4q}{(r-x)^2}$

$4x^2 = (r-x)^2 \quad | \sqrt{\quad}$

$2x = r - x$

$3x = r$

$x = \frac{r}{3} = \frac{6 \text{ cm}}{3} = 2 \text{ cm}$

6.

$m = 1 \cdot 10^{-6} \text{ kg}$

$E = 10 \frac{\text{N}}{\text{C}}$

$Q = ?$

$F_g = F_e$

$mg = Q \cdot E$

$Q = \frac{mg}{E}$

$Q = \frac{1 \cdot 10^{-6} \cdot 10}{10} = 10^{-6} \text{ C} = 1 \cdot 10^{-6} \text{ C}$

7.

$$F \sim q^2$$

$$F \sim \frac{1}{d^2}$$

prije udvostručavanja udaljenosti

$$mg = k \frac{q^2}{d^2}$$

nakon udvostručavanja udaljenosti

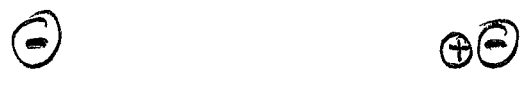
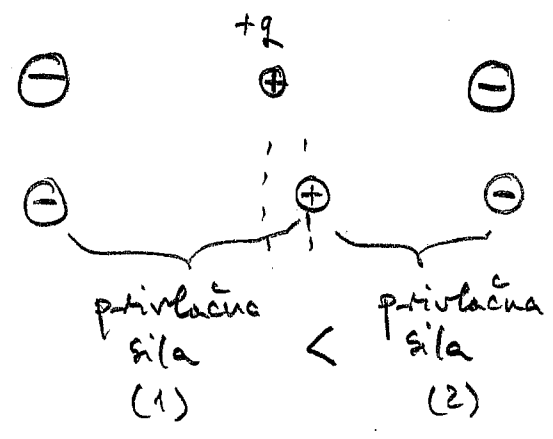
$$mg = k \cdot \frac{4q^2}{d'^2}$$

$$k \cdot \frac{q^2}{d^2} = k \cdot \frac{4q^2}{d'^2}$$

$$4d^2 = d'^2 \quad | \sqrt{\quad}$$

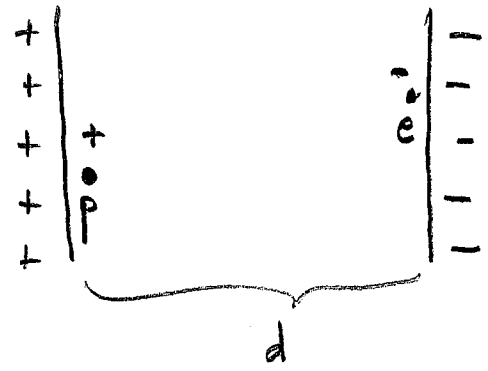
$$d' = 2d$$

8.



Naboj će se udaljavati od početnog položaja

9.



$m_p > m_e$   
 $E = \frac{U}{d}$  homogena el. polja

el. energija je ista za obje čestice (isti U, a p i e se ne razlikuju po nabojima) iznosu

$Q \cdot U = \frac{1}{2} m_p v_p^2$

$Q \cdot U = \frac{1}{2} m_e v_e^2$

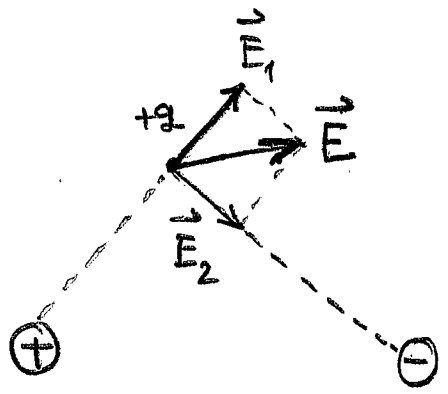
$\Downarrow$   
 $\frac{1}{2} m_p v_p^2 = \frac{1}{2} m_e v_e^2$

$E_{k,p} = E_{k,e}$

Kinetičke energije jednake su za obje čestice ( $E_k > 0!$ )

$m > 0$   
 $v^2 > 0$

10.



slučaj B

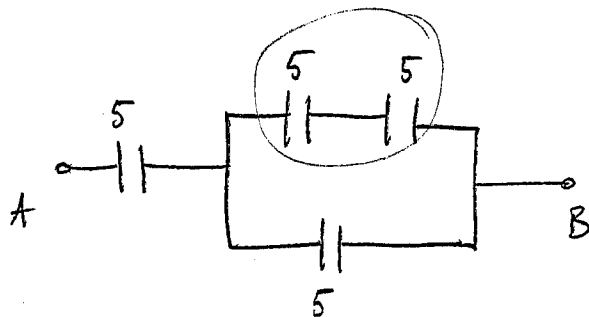
$\vec{E} = \vec{E}_1 + \vec{E}_2$  (pravilo paralelograma)

$\vec{E}_1$  vektor el. polja  $\oplus$  naboja  
 $\vec{E}_2$  - - -  $\ominus$  - - -

11. dobiti 3 elektrona { važan zadatak!

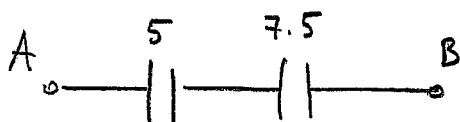
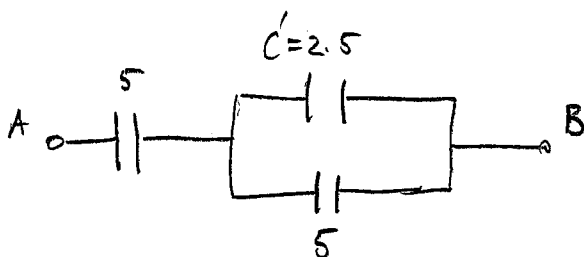
12.

5  $\mu\text{F}$



$$\frac{1}{C'} = \frac{1}{5} + \frac{1}{5} = \frac{2}{5} /^{-1}$$

$$C' = \frac{5}{2} = 2.5$$



$$\frac{1}{C} = \frac{1}{5} + \frac{1}{7.5}$$

$$\frac{1}{C} = 0.333 /^{-1}$$

$$C_{AB} = 3 \mu\text{F}$$

13.

$$E = 100 \frac{\text{N}}{\text{C}}$$

$$d = 20 \text{ cm} = 0.2 \text{ m}$$

$$\frac{\text{N}}{\text{C}} = \frac{\text{V}}{\text{m}}$$

$$U = ?$$

$$E = \frac{U}{d} \rightarrow U = Ed = 100 \cdot 0.2 = 20 \text{ V}$$

14.

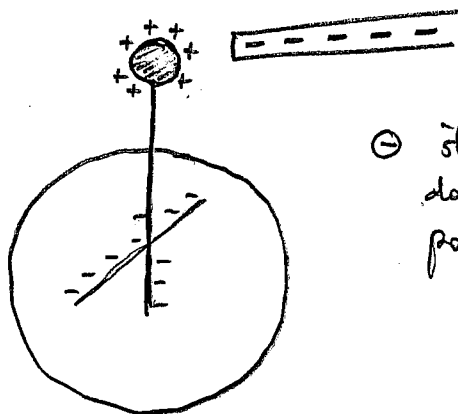
$$C_0 = \epsilon_0 \frac{S}{d}$$

$$C = \epsilon_r \epsilon_0 \frac{S}{d}$$

$$C \sim \epsilon_r$$

Kapacitet će porasti 6x!

15.



⊖ stop influenzija "tira" elektrone (-) do gornje i kut otklona kazaljke će se povećati.

16.

B opet influencija!

17.

$$Q = 10^6 e = 10^6 \cdot 1,6 \cdot 10^{-19} C = 1,6 \cdot 10^{-13} C$$

$$U = 0,001 V$$

$$C = ?$$

$$C = \frac{Q}{U} = \frac{1,6 \cdot 10^{-13}}{0,001} = 1,6 \cdot 10^{-10} F = 160 \cdot 10^{-12} F = 160 pF$$

$$Q = N \cdot e$$

18.

$$\epsilon_r = 6$$

$$S = 6.2 \cdot 10^{-3} \text{ m}^2$$

$$d = 2 \text{ mm} = 2 \cdot 10^{-3} \text{ m}$$

$$Q = 4 \cdot 10^{-8} \text{ C}$$

a.)  $C = ?$

$$C = \epsilon_0 \epsilon_r \frac{S}{d} = 1.64 \cdot 10^{-10} \text{ F}$$

b.)  $U = ?$

$$C = \frac{Q}{U} \rightarrow U = \frac{Q}{C} = 243 \text{ V}$$

c.)  $E = ?$

$$E = \frac{Q^2}{2C} = 4.88 \cdot 10^{-6} \text{ J}$$

19.

1. točna

2. točna

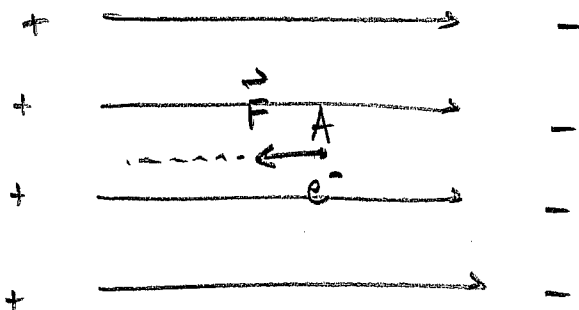
3. netočna

4. netočna

5. točna

} 3 točne tvrdnje

20.

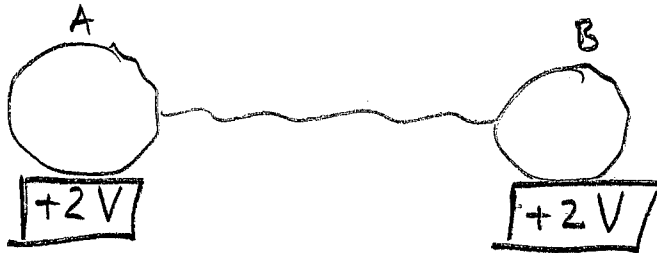
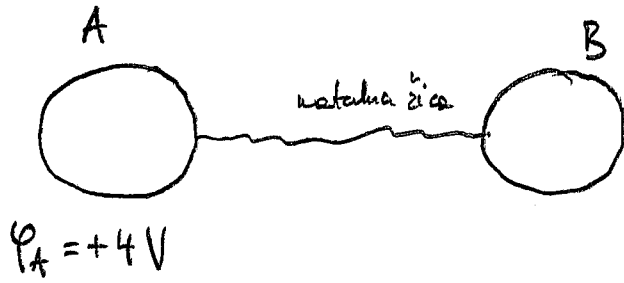


paralelna i suprotno  
smjeru silnice el. polja

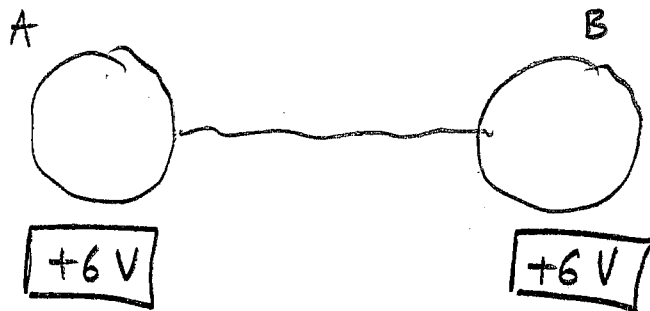
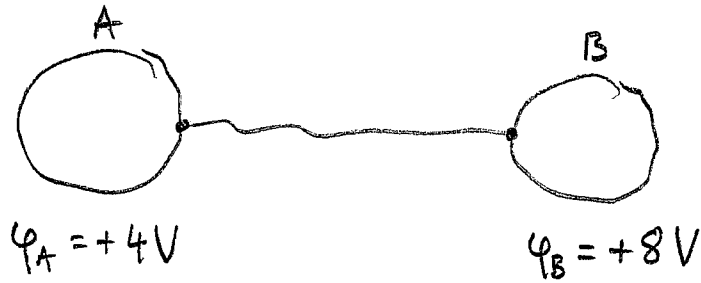
homogeno el. polje

21.

a.)

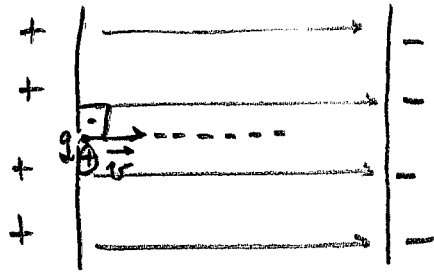


b.)





22.



Pojavi se sila  $\vec{F} = q\vec{E}$ ;  
 $\vec{F} = m\vec{a} \Rightarrow \vec{a} = \frac{q\vec{E}}{m}$  za +q!

odgovor: jednoliko ubrzan bez promjene smjera

23.

$$\epsilon_r > 1 \Rightarrow C \uparrow$$

24.

$$+3 \text{ nC}$$

⊕

$$-12 \text{ nC}$$

⊖

$$+3 \text{ nC} + (-12) \text{ nC} = -9 \text{ nC}$$



$$-4.5 \text{ nC}$$

$$-4.5 \text{ nC}$$



$$r = 3 \text{ cm}$$

kuglice dijele -9 nC  
na pola jer su iste  
veličine, tj. imaju jednak  
kapacitet.

$$F = ?$$

$$F = k \frac{q_1 q_2}{r^2} = 9 \cdot 10^9 \cdot \frac{4.5 \cdot 10^{-9} \cdot 4.5 \cdot 10^{-9}}{0.03^2} = 2 \cdot 10^{-4} \text{ N}$$

25.

$$C = 250 \mu\text{F} = 250 \cdot 10^{-6} \text{ F}$$

$$U = 220 \text{ V}$$

$$E = ?$$

$$E = W = \frac{1}{2} C U^2 = \frac{1}{2} \cdot 250 \cdot 10^{-6} \cdot 220^2 = 6.05 \text{ J}$$