Settimana: 9

Materia: Fisica
Classe: 5F
Data: 10/11 /25

Argomenti:

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$C = 10\,pF = 10 \cdot 10^{-12}\ F$
$V_{int} = 3{,}6\ kV = 3{,}6 \cdot 10^{3}\ V$

1) $R = ?$
2) $V(16\ cm) = ?$ $\quad r = 16\ cm = 16 \cdot 10^{-2}\ m$

(1) $C = \dfrac{Q}{V_{int}} = \dfrac{Q}{\frac{Q}{4\pi\varepsilon_0 R}} = 4\pi\varepsilon_0 R \rightsquigarrow \boxed{R = \dfrac{C}{4\pi\varepsilon_0} \simeq 9 \cdot 10^{-2}\ m}$

(2) $V(r) = \dfrac{Q}{4\pi\varepsilon_0 r} = \dfrac{C \cdot V_{int}}{4\pi\varepsilon_0 r} = V_{int}\dfrac{R}{r} = V_{int} \cdot \dfrac{9}{16} = \dfrac{36}{16} \cdot \dfrac{9}{4} \cdot 10^{3}\ V$

$= \dfrac{8{,}1}{4} \cdot 10^{3}\ V = 2{,}025 \cdot 10^{3}\ V \simeq 2 \cdot 10^{3}\ V$

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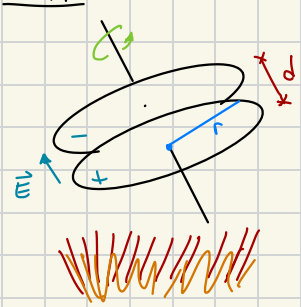
n 47:



$r = 11\ cm = 11 \cdot 10^{-2}\ m$
$d = 2{,}5\ mm = 2{,}5 \cdot 10^{-3}\ m$
$E = 8{,}02 \cdot 10^{4}\ V/m$

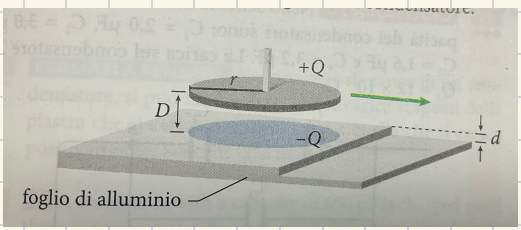
1) $C = ?$ $\quad Q = ?$
2) $\Delta V = ?$

(1) $E = \frac{V}{\varepsilon_0} = \frac{Q}{S \cdot \varepsilon_0} \rightsquigarrow Q = E \cdot S \cdot \varepsilon_0 = E \cdot \pi r^2 \varepsilon_0 \approx 24\ nC$

$C = \varepsilon_0 \frac{S}{d} = \varepsilon_0 \cdot \frac{\pi r^2}{d} \approx 135\ pF$

(2) $C = \frac{Q}{\Delta V} \rightsquigarrow \Delta V = \frac{Q}{C} \approx 200\ V$

n52:



Conduttore di forma circolare
$r = 1\ cm = 1 \cdot 10^{-2}\ m$
$D = 1\ mm = 1 \cdot 10^{-3}\ m$
$Q = 8{,}4 \cdot 10^{-10}\ C$
1) $C = ?$ $\Delta V = ?$
2) Scorrendo il foglio, aumenta D di d e $\Delta V_{new} = \Delta V + 5V$
$d = ?$

(1) $C = \varepsilon_0 \cdot \frac{S}{D} = \varepsilon_0 \frac{\pi r^2}{D} \approx 2{,}78\ pF$

$C = \frac{Q}{\Delta V} \rightsquigarrow \Delta V = \frac{Q}{C} \approx 3{,}02 \cdot 10^2\ V$

(2) Q rimane invariata perché viene dall'alto

$C_{new} = \varepsilon_0 \frac{\pi r^2}{D+d}$ ΔV_{new} ce l'ho.

$C_{new} = \frac{Q}{\Delta V_{new}} \rightsquigarrow \varepsilon_0 \frac{\pi r^2}{D+d} = \frac{Q}{\Delta V_{new}}$

$D + d = \varepsilon_0 \frac{\pi r^2}{Q} \cdot \Delta V_{new} \rightsquigarrow \boxed{d = \varepsilon_0 \frac{\pi r^2}{Q} \Delta V_{new} - D \approx 17\ \mu m}$

$d = \frac{CD}{Q} \cdot \Delta V_{new} - D$

$= \frac{\Delta V_{new}}{\Delta V} D - D$

$= D \left(\frac{\Delta V_{new}}{\Delta V} - 1 \right) = D \left(\frac{5V}{\Delta V} \right)$