

task_ddjurcpk494go2q1_with_calculation

Student Group

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electric field, magnetic field, exam ee2 SS2024

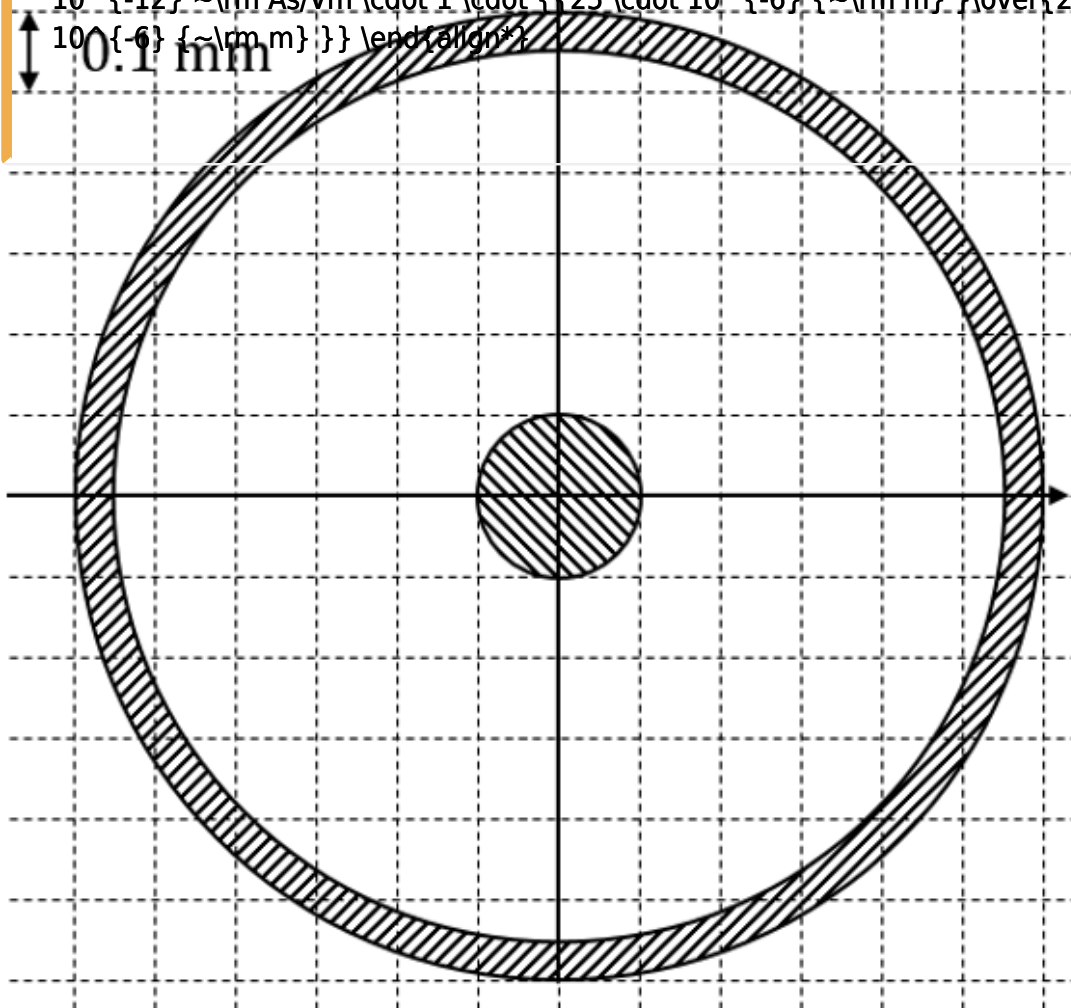
Exercise E1 Capacitor

(written test, approx. 12 % of a 120-minute written test, SS2024)

1. On the graph of the magnitude of the magnetic field strength B as a function of the distance r from the center of the capacitor, the following situation appears: Due to the given load, the following situation appears:

- Path:
- Inner conductor: $+3.3 \text{ mA}$, $+10 \text{ nC}$ (current into the plane of the diagram)
 - Outer conductor: -3.3 mA , 0 nC (current out of the plane of diagram)

$$C = \epsilon_0 \epsilon_r \frac{A}{d} \quad \text{with} \quad \epsilon_r = 8.854 \cdot 10^{-12} \text{ As/Vm} \cdot 1 \cdot \frac{25 \cdot 10^{-6} \text{ m}}{200 \cdot 10^{-6} \text{ m}}$$



1. What is the magnitude of the magnetic field strength B at $r = (-0.1 \text{ mm} | 0)$ and $r = (0.55 \text{ mm} | 0)$?

Path

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\begin{align*} C &= \varepsilon_0 \varepsilon_r \frac{A}{d} \quad \&= 8.854 \cdot 10^{-12} \frac{\text{As/Vm} \cdot 1 \cdot \{25 \cdot 10^{-6} \text{ m}\}}{200 \cdot 10^{-6} \text{ m}} \end{align*}
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