Lösungen zu elektrisches Feld

Lösungen:

A1: (780)

E =

a) 220 kV/m, b) 44 kV/m, c) 22 kV/m, d) 6290 kV/m, e) 4400 kV/m f) 22 MV/m

A2: (781)

a) 5,8V, b) 55,1V, c) 136V, d) 290V, e) 1160V

A3: (782)

$E = \frac{U}{d} = \frac{IR}{d} = \frac{I\rho}{A} = 0{,}06$ V/m mit $R = \frac{\rho d}{A}$ ρ = Rho

A4: (783)

$E = \frac{U}{d} = \frac{U}{l_m N} = 3{,}87$ mV/m

A5: (784)

$I = \frac{U}{R} = \frac{Ed}{R} = \frac{EA}{\rho} = 17{,}9$ A

A6: (785)

d = 1,59 cm

A7: (786)

A = 2,9 mm^2

A8: (787)

$E = \frac{U}{r_i \ln \frac{r_a}{r_i}} = 690$ kV/m

A9: (788)

$E = \frac{U}{r \ln \frac{r_a}{r_i}}$ = a) 690 kV/m, b) 571 kV/m, c) 428 kV/m, d) 342 kV/m, e) 34 kV/m, f) 8,6 kV/m

A10: (789)

$E = \frac{U}{r_i \ln \frac{r_a}{r_i}} = 1825$ kV/m

A11: (790)

d = 0,23 mm

A12: (791)

E = 70 kV/m

A13: (792)

r = 50 cm

A14: (793)

r = 0,11 mm

A15: (794)

d = a) 95µm, b) 84,4µm, c) 1,52mm

A16: (795)

r = 0,9 cm (Punkt auf Oberfläche Kugel → $r_0 = r$ → $E = \frac{U}{r}$, $E_{DLuft} = 20000$ V/cm)

A17: (796)

$Q = D*A = \varepsilon_0 \varepsilon_r EA \frac{\varepsilon_0 \varepsilon_r UA}{d}$ = a) $24{,}9*10^{-8}$C, b) $69{,}7*10^{-7}$C, c) $8{,}8*10^{-8}$C, d) 80 µC

A18: (797)

a) $A = 4 \pi r^2 = 201$ cm^2 , D = 0,249 µC/m^2 b) E = 28120 V/m c) U = 1125 V

A19: (798)

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$\varepsilon_r = \frac{Qd}{\varepsilon_0 UA}$ = a) 5, b) 5, c) 6,4, d) 8,2

A20: (799)

1) $U = E_d * d$ = a) 144 kV, b) 100 kV, c) 140 kV

A21: (800)

a) Ladungsmenge wird nicht geändert: $D = \varepsilon_0 \frac{U_1}{d} = \varepsilon_0 \varepsilon_r \frac{U_2}{d}$ ➔ U_2 = 104,8V

b) U_2 = 6,04V

A22: (801)

E = const → $Q = \frac{\varepsilon_0 \varepsilon_r UA}{d}$ = a) $43{,}2 * 10^{-9}$C, b) $404 * 10^{-9}$C

A23: (802)

$U = \frac{Q}{\varepsilon_0 \varepsilon_r A}$ = 5 MV/m

A24: (881)

C = 313 µF

A25: (882)

C = 11,9 F

A26: (883)

F = a) 122 mN, b) 54 mN, c) 30 mN

A27: (884)

F = a) 61 mN, b) 27 mN, c) 15 mN

A28: (886)

W = 0,098 J

A29: (887)

F = 2,77 mN mit E = $2{,}5\ 10^6$ V/m und A = 10^{-4} m^2

A30: (892)

d = 2 cm ; U = 2000 V

A31: (893)

F = 19,6 mN

A32: (894)

r = 33,7 cm

A33: (895)

r = 16 mm

A34: (896)

R_{Kugel} = 2mm

A35: (897)

r = 18 cm

A36: (888)

C = 3,6 µF

A37: (889)

C = 1,3 µF

A38: (890)

U = 281 V

A39: (891)

U = 167 V