Chapter 26 Even Answers

2. (a) 1.00 μF (b) 100 V

4. (a) 8.99 mm (b) 0.222 pF (c) 2.22×10^{-11} C

6. 11.1 nF, 26.6 C

8. 3.10 nm

10. $\dfrac{(2N-1)(\pi-\theta)R^2\epsilon_0}{d}$

12. 2.13×10^{16} m^3

14. $\dfrac{mgd\tan\theta}{q}$

16. 708 μF

18. (a) 3.53 μF (b) 6.35 V and 2.65 V (c) 31.8 μC on each

20. $\dfrac{1}{2}C_p \pm \sqrt{\dfrac{1}{4}C_p{}^2 - C_pC_s}$

22. $C_{eq} = 1.83C$

24. (a) 398 μF in series (b) 2.20 μF in parallel

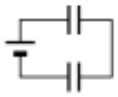
26. $\dfrac{60R}{37k_e}$

28. 6.04 μF

30. 12.9 μF

32. (a) Circuit diagram:

Stored energy = 0.150 J



(b) Potential Difference = 268 V
Circuit Diagram:

34. 2.51×10^{-3} m^3, 2.51 L

36. $\dfrac{Q^2}{2A\epsilon_0 k}$

40. 10.8 pF

42. (a) 13.3 nC (b) 272 nC

44. $\sim 10^{-6}$ F and $\sim 10^{2}$ V for two 40-cm by 100-cm sheets of aluminum foil sandwiching a thin sheet of plastic.

46. (a) 369 pC (b) 118 pF, 3.12 V (c) –45.5 nJ

48. (a) 1.53 nF (b) 18.4 nC

(c) 1.84×10^{-4} C / m^2, 1.83×10^{-4} C / m^2 (d) 694 V / m

50. (a) $\left(-9.10\mathbf{i}+8.40\mathbf{j}\right)\times10^{-12}$ C · m (b) $\left(-2.09\times10^{-8}\ \mathbf{k}\right)$ N · m

(c) 112 nJ (d) 228 nJ

52. 579 V

54. (a) 3.33 μF (b) 60.0 V, 30.0 V, 60.0 V, 30.0 V

(c) 180 μC, 180 μC, 120 μC, 120 μC (d) 13.4 mJ

56. (a) 4.00×10^{-5} J (b) 500 V

58. (a) $\dfrac{\epsilon_0 A}{d}\left(\dfrac{\kappa_1}{2}+\dfrac{\kappa_2\kappa_3}{\kappa_2+\kappa_3}\right)$ (b) 1.76 pF

60. (b) $\dfrac{1}{C}\rightarrow\dfrac{1}{4\pi\epsilon_0 a}+\dfrac{1}{4\pi\epsilon_0 b}$

62. (a) $\dfrac{\epsilon_0}{d}\left(l^2+lx(\kappa-1)\right)$ (b) $\dfrac{\epsilon_0(\Delta V)^2}{2d}\left(l^2+lx(\kappa-1)\right)$

(c) $\dfrac{\epsilon_0(\Delta V)^2}{2d}l(\kappa-1)$ to the left (d) 1.55×10^{-3} N

64. Gasoline has 194 times the specific energy content of the battery and 727000 times that of the capacitor.

66. Put five 6.00 pF capacitors in series.

68. 8.00 kV

70. (a) $\dfrac{\kappa_1\kappa_2\epsilon_0 WL}{(\kappa_1-\kappa_2)d}\ln\left(\dfrac{\kappa_1}{\kappa_2}\right)$

72. 750 μC on C_1 , 250 μC on C_2

76. $\dfrac{4}{3}C$