Chapter 31 Even Answers

2.		0.800 mA					
4.	(b)	3.79 mV	(c)	28.0 mV			
6.		7.85×10^{-5} s					
8.	(a)	$\frac{\mu_0 n \pi r_2^2}{2R}\left(\frac{\Delta I}{\Delta t}\right)$	(b)	$\frac{\mu_0^2 n \pi r_2^2}{4 r_1 R}\left(\frac{\Delta I}{\Delta t}\right)$	(c)	upward	
10.		$-14.2 \cos(120 t)$ mV					
12.		61.8 mV					
14.		$N \mu_0 n I_{\max} \pi R^2 \alpha e^{-\alpha t}$ counter - clockwise					
16.		0.672 V					
18.		$-\frac{\mu_0 N \pi r^2}{l}\left(\frac{I_2 - I_1}{\Delta t}\right)$					
20.		1.00 m / s					
22.	(a)	0.500 A	(b)	2.00 W	(c)	2.00 W	
24.		0.121 A clockwise					
26.	(a)	To the right	(b)	To the right			
	(c)	To the right	(d)	Into the paper.			
28.	(b)	0.750 mA					
30.		0.259 mV					
32.	(a)	8.00×10^{-21} N, clockwise.	(b)	1.33 s			
34.		2.23×10^{-5} N / C					
36.	(a)	$(19.6\ \mathrm{V}) \sin(314 t)$	(b)	19.6 V			
38.		12.6 mV					
40.		$I = I_{\max} \cos \omega t$. See solution.					

42. (a) 1.60 V (b) zero

(c) They would be unchanged (d) See solution (e) See solution

44. 0.742 T

46. Both are correct. Note that one occurs as the brake approaches and the other occurs as the brake departs that point on the rail.

48. $\left(-4.39\times10^{11}\ \mathbf{i}-1.76\times10^{11}\ \mathbf{j}\right)\ \text{m / s}^2$

50. See solution.

(a) Doubling N doubles amplitude (b) Doubling ω doubles amplitude, halves period.

(c) Doubling ω and halving N leaves the amplitude the same and cuts the period in half.

52. 0.0623 A down through 6.00 Ω, 0.860 A down through 5.00 Ω, 0.923 A up through 3.00 Ω

54. $\sim 10^{-4}$ V

56. 458 μV

58. (b) 0.250 T

62. (a) $C\pi a^2 K$ (b) upper plate

(c) A changing magnetic field induces an electric field in the wire.

64. (a) 97.4 nV (b) Clockwise.

68. $\dfrac{mgR}{B^2\ell^2}$

70. $v=\dfrac{MgR}{B^2\ell^2}\left[1-e^{-B^2\ell^2 t/R(M+m)}\right]$

72. $\mathcal{E}=\dfrac{\left(1.18\times10^{-4}\right)t}{0.800-4.90t^2}\ \text{V}$; 98.3 μV

74. $\tau\propto-\sin^2\theta$; See solution.