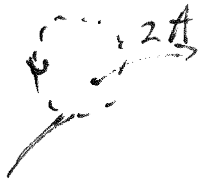
Ch. 12 Prob. 42

By Amperes Law $\oint \vec{B} \cdot d\vec{l} = \mu_0 I$

a)

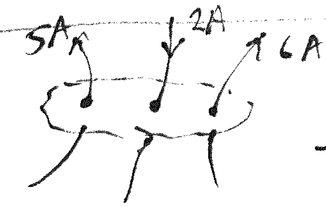


Then $\oint \vec{B} \cdot d\vec{l} = 4\pi \times 10^{-7} \frac{T \cdot m}{A} (2A)$

$= 8\pi \times 10^{-7}\ T \cdot m$

$= \boxed{2.51 \times 10^{-6}\ T \cdot m}$

b)



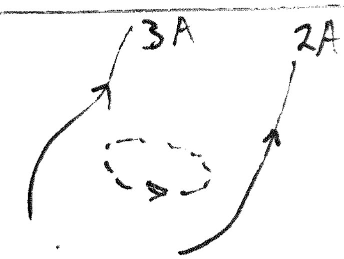
Then $\oint \vec{B} \cdot d\vec{l} = \left(4\pi \times 10^{-7} \frac{T \cdot m}{A}\right)(5A - 2A + 6A)$

$= (4\pi \times 10^{-7})(9)\ T \cdot m$

$= 36\pi \times 10^{-7}\ T \cdot m$

$= \boxed{1.13 \times 10^{-5}\ T \cdot m}$

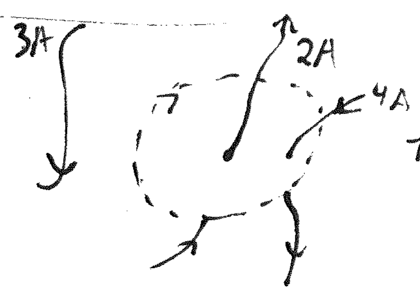
c)



Then $\oint \vec{B} d\vec{l} = \left(4\pi \times 10^{-7} \frac{T \cdot m}{A}\right)(0A)$

$= \boxed{0\ T \cdot m}$

d)



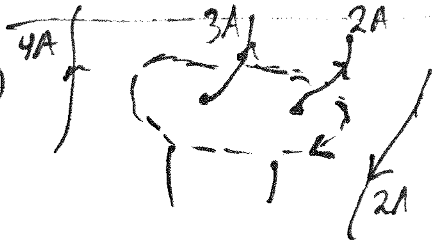
Then $\oint \vec{B} \cdot d\vec{l} = \left(4\pi \times 10^{-7} \frac{T \cdot m}{A}\right)(2A - 4A)$

$= (4\pi \times 10^{-7})(-2)\ T \cdot m$

$= -8\pi \times 10^{-7}\ T \cdot m$

$= \boxed{-2.51 \times 10^{-6}\ T \cdot m}$

e)



Then $\oint \vec{B} d\vec{l} = \left(4\pi \times 10^{-7} \frac{T \cdot m}{A}\right)(3A + 2A)$

$= (4\pi \times 10^{-7})(5)\ T \cdot m$

$= 20\pi \times 10^{-7}\ T \cdot m$

$= \boxed{6.28 \times 10^{-6}\ T \cdot m}$