

Answers Exam 3 2013

1. a) $\oint \vec{B} \cdot d\vec{r} = \mu_0 (i_1 + i_2)$

b) $B_x = \frac{\mu_0 i_1}{5\pi d}$; $B_y = \frac{\mu_0 i_1}{10\pi d}$

c) $\vec{B} = B_x \vec{i}_x$

2. a) $\vec{B}_1 = 0$; $\vec{B}_2 = 0$; $B_3 = \frac{\mu_0 i}{4\pi a} \odot$; $\vec{B}_4 = \frac{\mu_0 i}{4\pi a} \otimes$

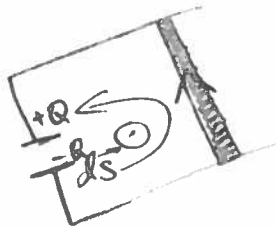
b) $\vec{B} = 0$

3. a) $i = \frac{V}{R}$

b) $L \frac{di}{dt} + Ri = V$

c) $i(t) = \frac{V}{R} (1 - e^{-\frac{R}{L}t})$

4. a) $R \frac{dQ}{dt} + \frac{1}{C} Q = -B W \cos \theta v_z$



b) $Q = -CBW \cos \theta v_z$

c) $\vec{F} = CB^2 W^2 \cos \theta \frac{d^2 x}{dt^2}$ to the right

d) $i = \frac{mg \sin \theta}{WB \cos \theta + \frac{m}{CBW \cos \theta}}$