Answers Test 3 2009

1. a) $\vec{B} = \frac{\mu_0 i}{2R} \odot$

b) $\vec{B} = 0 \quad (d\vec{S} \times \vec{r} = 0)$

c) $\vec{B} = \frac{E}{v} \odot$

2. a) $B = \frac{\mu_0 i}{2\pi r}$; $r > H$

$B = \frac{\mu_0 i}{2\pi H^2} r$; $r < H$

b) $x = \frac{W - \sqrt{W^2 - 4H^2}}{2}$; $x = W/2$

3. a) $\Phi = \frac{\mu_0 i_0 (1 - \gamma t) D}{2\pi} \ln \frac{H+W}{H}$

b) $L\frac{di}{dt} + Ri = \frac{\mu_0 i_0 \gamma D}{2\pi} \ln \frac{H+W}{H}$

c) $i = \frac{\mu_0 i_0 \gamma D}{2\pi R} \ln \frac{H+W}{H}$

4. a) $\Phi = -B(1 - \gamma t) WH \quad \otimes B \; \odot d\vec{S}$

b) $L\frac{di}{dt} + Ri = B_0 \gamma H W$

c) $i(t) = \frac{B_0 \gamma H W}{R} \left(1 - e^{-\frac{R}{L}t}\right)$