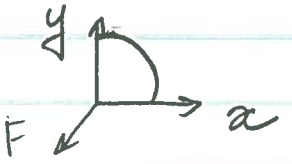
Answers Test 1 2007

1. $\vec{E} = -\frac{a}{b}\frac{mg}{q}\vec{i}_x$

2. a) $\vec{F} = -\frac{Qq_1}{2\pi^2\varepsilon_0 R^2}\vec{i}_x - \frac{Qq_1}{2\pi^2\varepsilon_0 R^2}\vec{i}_y$



b) $F_x = -\frac{1}{4\pi\varepsilon_0}\int_0^{\frac{\pi}{2}} \frac{q_1\lambda(\theta)}{R}\cos\theta\, d\theta$

$F_y = -\frac{1}{4\pi\varepsilon_0}\int_0^{\frac{\pi}{2}} \frac{q_1\lambda(\theta)}{R}\sin\theta\, d\theta$

3. a) $V(r) = \frac{c}{3r^3}$

b) $E_x = \frac{cx}{(x^2+y^2)^{5/2}}$ $E_y = \frac{cy}{(x^2+y^2)^{5/2}}$

4. a) $\Phi_{far} = 0$ $\Phi_{near} = \frac{1}{2}\alpha L H W^2$

b) $\Phi = \beta W H$

c) $\Phi = \frac{\alpha L H^3}{12}$