

# Answers Exam 1 2014

$$1) q_2 = \frac{2q_1 H (b+H)^2}{(a^2 + H^2)^{3/2}}$$

$$q_2 = \frac{4q_1}{\sqrt{2}}$$

$$2) V = \frac{1}{4\pi\epsilon_0} \int_{-H}^{2H} \frac{Q}{H} \frac{dy}{\sqrt{x^2 + y^2}}$$

$$V = \frac{1}{4\pi\epsilon_0} \int_{-H}^{2H} Q_0 \frac{y}{H} \frac{dy}{\sqrt{x^2 + y^2}}$$

$$3) W = 0$$

$$4) Q_{\text{enc}} = \epsilon_0 \left( \alpha a^4 + \frac{\beta a^4}{2} \right)$$