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ECE 488
Image Formation 1

1.

$$E = (\frac{D}{2})^2 \times \pi \times \int_{t_0}^{t_0+T} \frac{1}{683}(0.5 \times \sin(t) + 0.5)dt$$

$$E = \frac{1}{4}\pi D^2(7.3206 \times 10^{-4}T - 7.3206 \times 10^{-4}\cos(T + t_0) + 7.3206 \times 10^{-4}\cos t_0)$$

$$E = D^2(5.7496 \times 10^{-4}T - 5.7496 \times 10^{-4}\cos(T + t_0) + 5.7496 \times 10^{-4}\cos t_0)$$

2.

$$E_{capacitor} = \frac{CV^2}{2}$$

$$V = \sqrt{\frac{2E}{C}}$$

$$V_{total} = \sqrt{\frac{2E}{C}} \times g$$

$$V_{total} = \sqrt{\frac{2 \times D^2(5.7496 \times 10^{-4}T - 5.7496 \times 10^{-4}\cos(T+t_0) + 5.7496 \times 10^{-4}\cos t_0)}{1}} \times g$$

3.

See code.