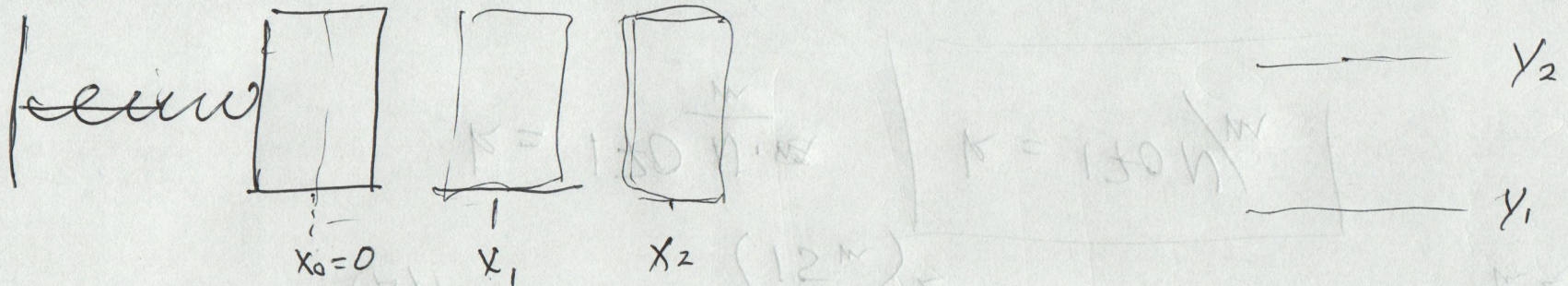


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3.



$$x_2 = 2x_1$$

$$y_2 = 2y_1$$

Pos ① $E_1 = \frac{1}{2} k (\Delta x_1)^2 = \frac{1}{2} k x_1^2$

① $E_1 = mg y_1$

② $E_2 = \frac{1}{2} k x_2^2 = \frac{1}{2} k (2x_1)^2$

② $E_2 = mg y_2 = 2mg y_1$

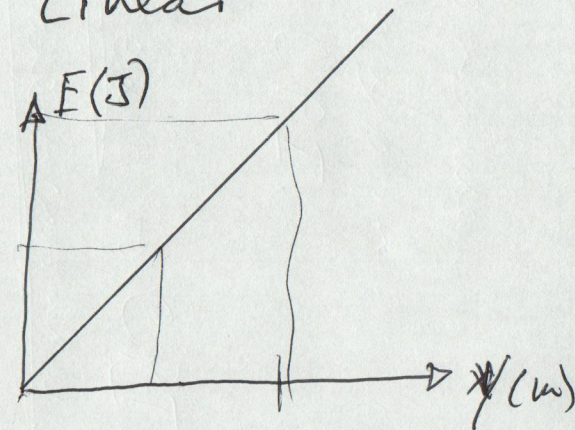
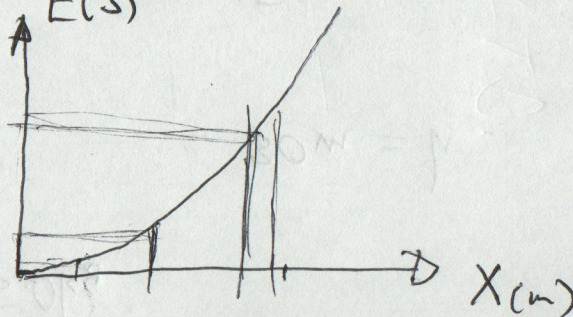
$$E_2 = \frac{1}{2} k (4 x_1^2)$$

Linear

$$E_2 = 2k x_1^2$$

Stored Elastic Energy quadruples
 $E(J)$

Quadratic

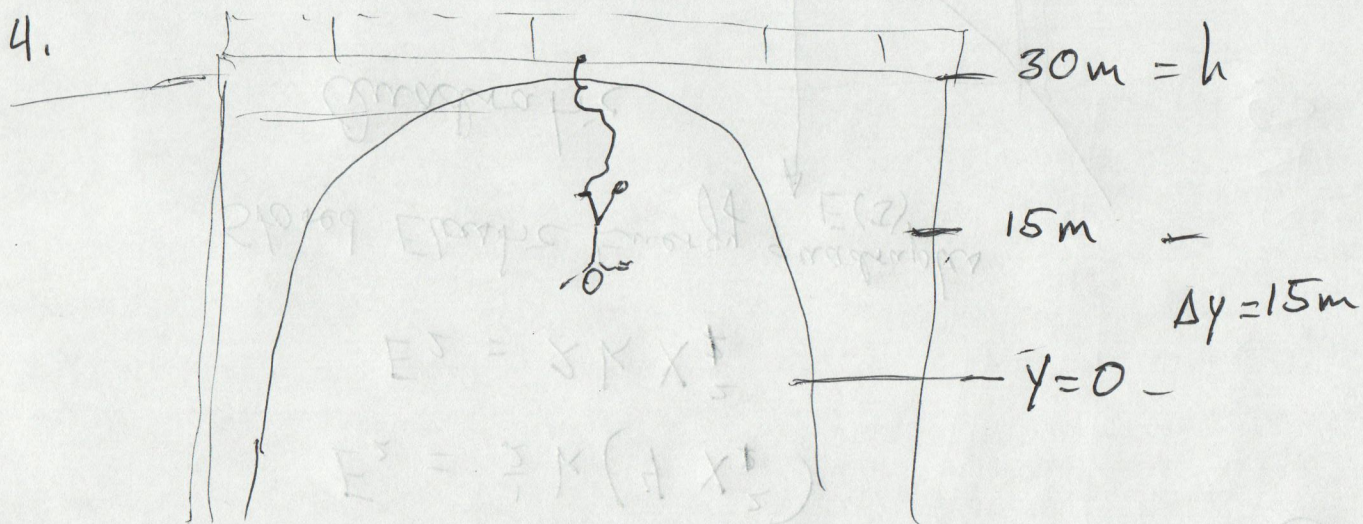


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4.

$$m = 65.0 \text{ kg}$$

(2)



$$E_{pg} = mgh = mg(30\text{m})$$

$h = 30\text{m}$

$$E_{ep} = \frac{1}{2} k (\Delta y)^2 \quad \Delta y = 15 \text{ m}$$

$$mgh = \frac{1}{2} k (\Delta y)^2$$

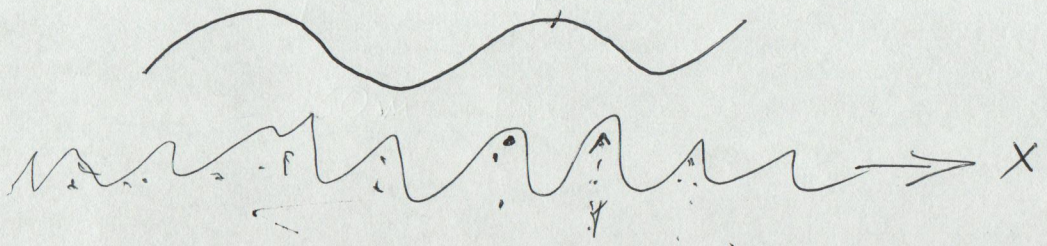
$$k = \frac{2mgh}{(\Delta y)^2} = \frac{2(65.0 \text{ kg})(9.8 \text{ m/s}^2)(30 \text{ m})}{(15 \text{ m})^2} \quad \frac{\text{N}}{\text{m}^2} (\text{kg m/s}^2) (\text{m})$$

$$k = 170 \frac{\text{N} \cdot \text{m}}{\text{m}}$$

$$k = 170 \text{ N/m}$$

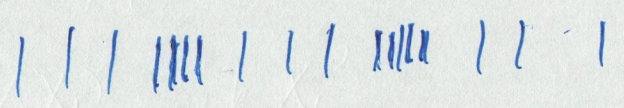
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4. I. Water Waves
.. = H₂O



Amplitude is H₂O molecules displacing up & down at the surface.

II. Sound Waves

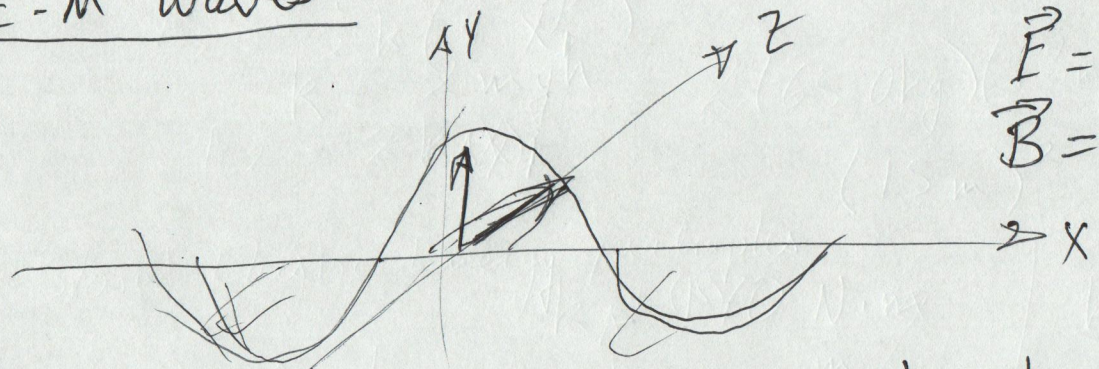


Slinky



Amplitude is high & low density of medium (air)

III. E-M Waves



$\vec{E} = x-y$ plane
 $\vec{B} = x-z$ plane

$A \sin(kx)$

Amplitude is the strength of the electric field and the magnetic field.