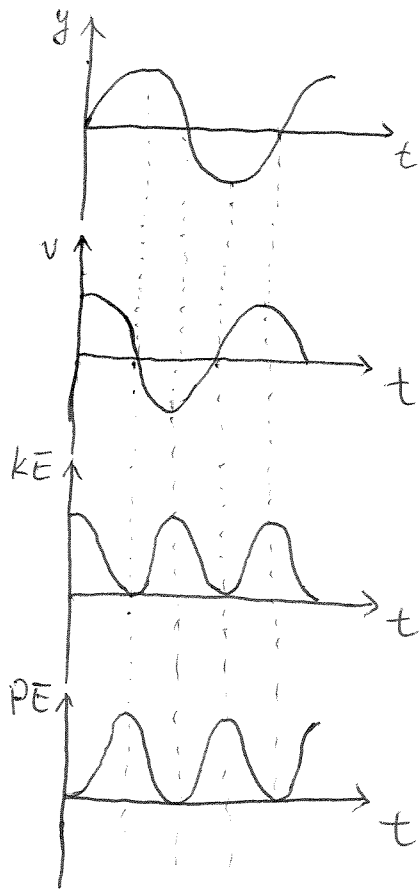


1. a)  $mg = kl \Rightarrow k = \frac{mg}{l} = \frac{1 \times 9.8}{0.2} \text{ N/m} = 49 \text{ N/m}$

b)  $f = \frac{1}{2\pi} \sqrt{\frac{k}{m}} = \frac{1}{2 \times 3.14} \sqrt{\frac{49}{1}} \text{ Hz} = 1.11 \text{ Hz}$

#

2.



$$\begin{cases} KE = \frac{1}{2}mv^2 \\ PE = \frac{1}{2}ky^2 \end{cases}$$

note that:  $KE + PE = \bar{E}_{total} = \text{const.}$

#

4.  $f = \frac{v}{2\pi} \sqrt{\frac{a}{vl}} = \frac{343}{2 \times 3.14} \sqrt{\frac{0.02}{0.5 \times 0.05}} \text{ Hz} = 48.85 \text{ Hz}$

#

5.  $PE = \frac{1}{2}ky^2 = \frac{1}{2} \times 49 \times (0.05)^2 \text{ J} = 0.061 \text{ J}$

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