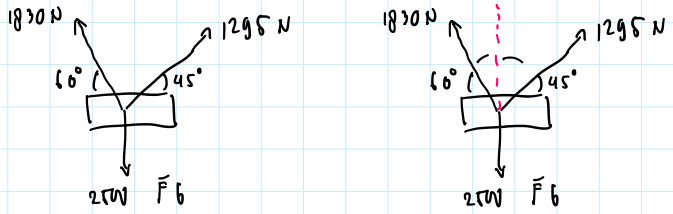
Kuis Fismek

Friday, 01 October 2021 16.20

1. Menurunkan piano dengan massa 255 kg dari lantai 2 dengan 2 tali. Tinggi gedung 5 meter. Usaha untuk setiap gaya (T_1, T_2, dan F_G) - $g = 9{,}81\ m/s^2$



- $F_1 = (-T_1) \cdot \sin 60^\circ = (-1830) \cdot \frac{1}{2}\sqrt{3} = (-915\sqrt{3})\ N$
  $W_1 = (-915\sqrt{3}) \cdot 5 = -4575\sqrt{3}$
- $F_2 = (-T_2) \cdot \sin 45^\circ = (-1295) \cdot \frac{1}{2}\sqrt{2} = \left(-\frac{1295}{2}\sqrt{2}\right)$
  $W_2 = \left(-\frac{1295\sqrt{2}}{2}\right) \cdot 5 = -\frac{6475\sqrt{2}}{2}$
- $F_G = 2500\ N$
  $W_G = 2500 \cdot 5 = 12500\ N$

2. Seorang anak memiliki massa 60 kg berdiri pada pegas

$g = 10\ m/s^2$

$k = 2500\ N/m$

Ketika lift kantor, maka anak tersebut melakukan gaya berlawanan yaitu kebawah dengan percepatan $3\ m/s^2$ ke arah bawah

$F_{total} = F_g + F_{orang} = (60 \cdot 10) + (60 \cdot 3) = 60 \cdot 13 = 780\ N$

- Jarak pegas berpindah : $F = k\,\Delta x$
  $780 = 2500 \cdot \Delta x$

$$\Delta x = \frac{780}{25N} = 0,312 \text{ m}$$

c) Energi Potensial Pegas : $Up = \frac{1}{2} k \Delta x^2 = \frac{1}{2} F \Delta x = \frac{1}{2} \cdot 780 \cdot 0,312$

$= 121,68$ joule

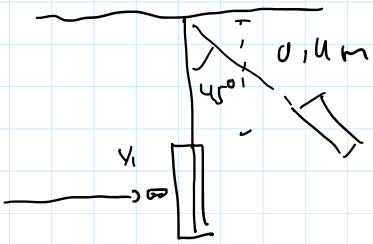
∴ Jadi, Jarak berpindah pegas sebesar $0,312$ m dan Energi potensial pegas sebesar $121,68$ joule

[3] Peremudah menumbuk balok kayu $3kg = M$

massa peluru $= 0,15 kg = m$

$e = 0$ $\quad g = 10$ $\quad e = \frac{-(V'_2 - V_i)}{V_2 - V_1} = 0$

$V'_2 = V'_1$



$Ep = m g h = (3 + 0,15) \cdot 10 \cdot 0,4$

$= 3,15 \cdot 10 \cdot 0,4 = 12,6$ joule

a) $Ep = Ek$

a) $12,6$ joule $= \left(\frac{1}{2} m v^2\right) = \left(\frac{1}{2} \cdot (3,15) \cdot v^2\right)$

$v = 2\sqrt{2} = V_1'$

a) Energi kinetik = $\frac{1}{2} m v_1^2 = \frac{1}{2} \cdot (0{,}15) \cdot v_1^2$

$v = 2\sqrt{2} = v_1'$

b) Mencari momentum : $v_1' = v_2' = v$

$m v_1 + M v_2 = m v_1' + M v_2'$

$0{,}15\, v_1 + 0 = (m+M)$

$0{,}15\, v_1 = (3{,}15)\, 2\sqrt{2}$

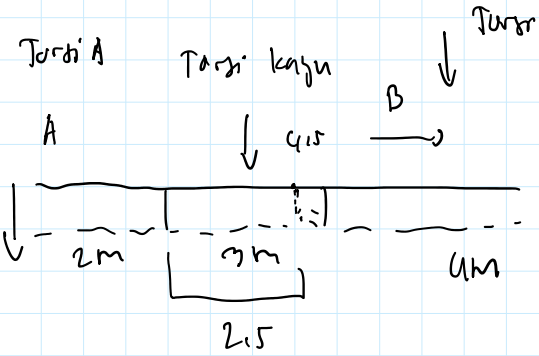
$v_1 = 42\sqrt{2} = 59{,}3$ m/s

Jadi kecepatan awal peluru adalah : 59,3 m/s

4) A = 50 kg

B = 90 kg

M = 100 kg



Jarak titik tengah kayu

$\frac{2+3+4}{2} = \frac{9}{2} = 4{,}5$

$T_{net} = -T_A + T_{kayu\ 2,5} - T_{kayu\ 0,5} + T_B = 0$

$= -(500) \cdot 2 + (100)\, 2{,}5 - (100)\, 0{,}5 + (900) \cdot R_B = 0$

$R_B = -1{,}1$