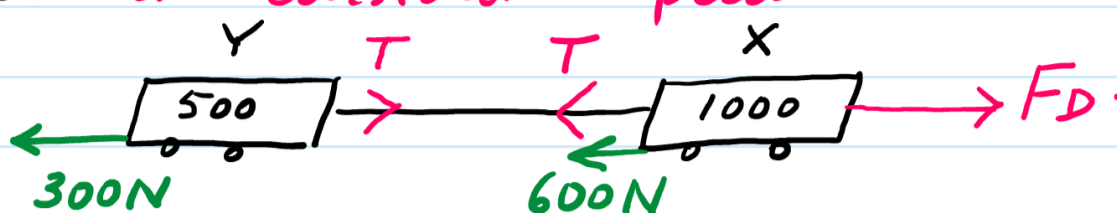


15 November 2020 18:13

Q: The diagram shows a Tractor (X) of $m = 1000 \text{ kg}$ pulling a Trailer (Y). The friction force on X = 600 N and on Y = 300 N .

(i) Cal the driving force F_D and the tension (T) if the system moves at constant speed.



forces balanced b/c constant speed

for Y $T = 300 \text{ N}$

for X $F_D = T + 600 \quad \therefore F_D = 900 \text{ N}$

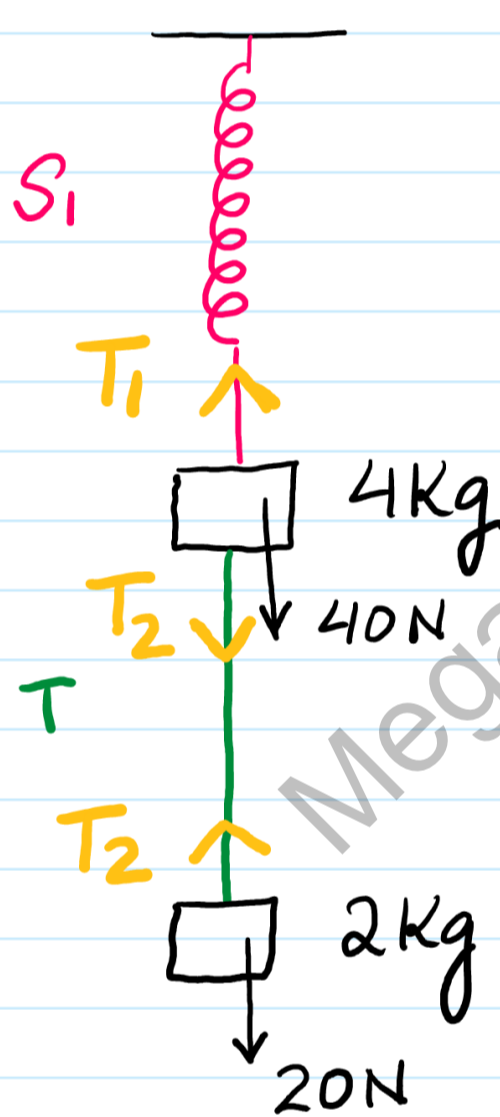
(ii) Cal F_D and T if the system acc at 2 m/s^2 .

Same diagram

for Y $F = ma$
 $T - 300 = 500(2)$
 $T = 1300 \text{ N}$

for X $F = ma$
 $F_D - T - 600 = 1000(2)$
 $F_D = 3900 \text{ N}$

Q// A mass of 4 kg is attached to a Spring S_1 . This mass is attached to another mass of 2 kg via a Thread (T) as shown below.

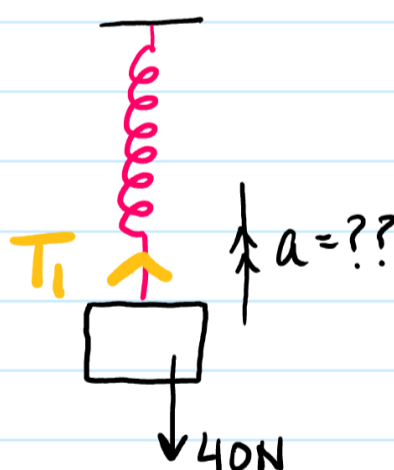


(i) Mark the Tensions in S_1 and T & mark the weights.

(a) System at REST. find T_1 & T_2 .

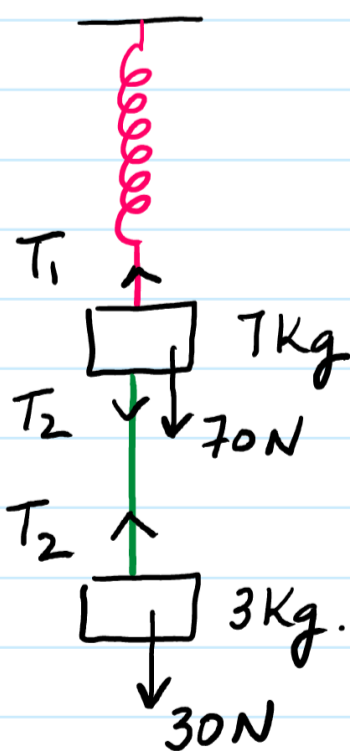
for 2 kg . $T_2 = 20 \text{ N}$
 for 4 kg $T_1 = T_2 + 40$
 $T_1 = 60 \text{ N}$

(b) The thread is now "cut" from the middle so T_2 becomes zero. Cal the upward acc of 4 kg mass?



$F = ma$
 $T_1 - 40 = 4a$
 $60 - 40 = 4a$
 $a = 5 \text{ m/s}^2$

Ex

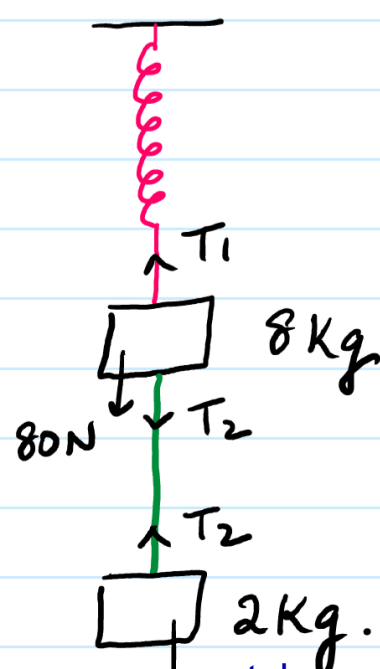


Cal acc of 7 kg mass when bottom string is cut?

at Rest $T_2 = 30 \text{ N}$
 $T_1 = 100 \text{ N}$

acc $F = ma$
 $T_1 - 70 = 7a$
 $100 - 70 = 7a$
 $a = \frac{30}{7} \text{ m/s}^2$

Ex



Cal acc?

$T_2 = 20 \text{ N}$
 $T_1 = 100 \text{ N}$

$F = ma$
 $100 - 80 = 8a$
 $a = \frac{20}{8} \text{ m/s}^2$