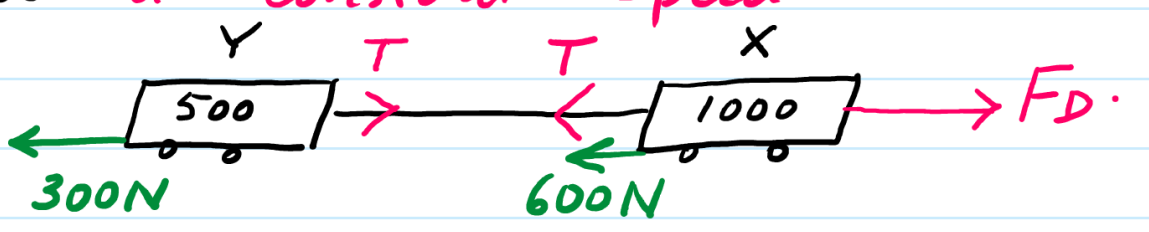
15 November 2020 18:13

Q:. The diagram shows a Tractor (X) of m = 1000 Kg pulling a Trailer (Y). The friction force on X = 600N and on Y = 300N.

(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 $T = 300N$

for X $F_D = T + 600$ $\therefore F_D = 900N$

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

Same diagram

for Y $F = ma$

$T - 300 = 500(2)$

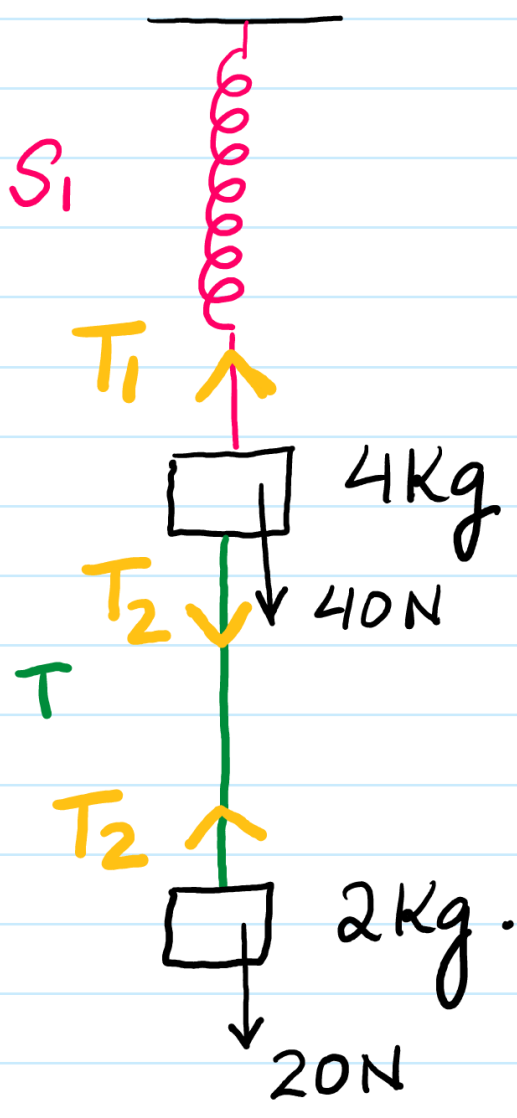
$T = 1300N$

for X $F = ma$

$F_D - T - 600 = 1000(2)$

$F_D = 3900\ N$

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.

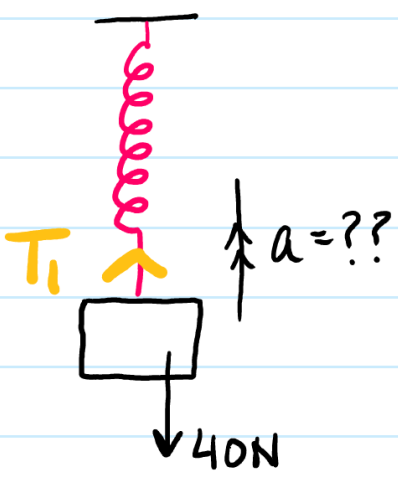
(a) System at REST. find T_1 & T_2.

for 2 Kg. $T_2 = 20N$

for 4 Kg $T_1 = T_2 + 40$

$T_1 = 60N$

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



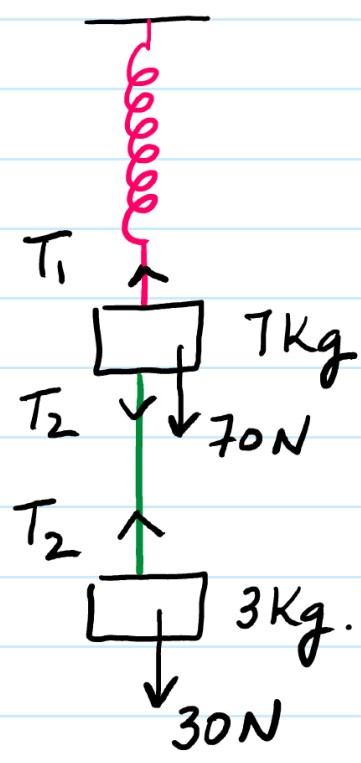
$F = ma$

$T_1 - 40 = 4a$

$60 - 40 = 4a$

$a = 5\ m/s^2$.

Ex



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

at Rest $T_2 = 30N$

$T_1 = 100N$

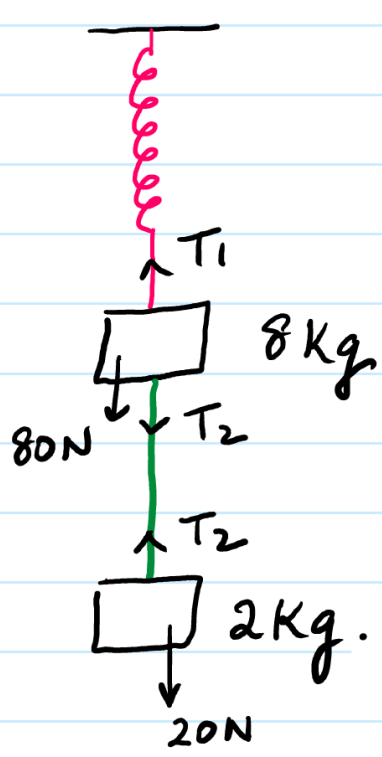
acc $F = ma$

$T_1 - 70 = 7a$

$100 - 70 = 7a$

$a = \frac{30}{7}\ m/s^2$

Ex



Cal acc ?

$T_2 = 20N$

$T_1 = 100N$

$F = ma$

$100 - 80 = 8a$

$a = \frac{20}{8}\ m/s^2$.