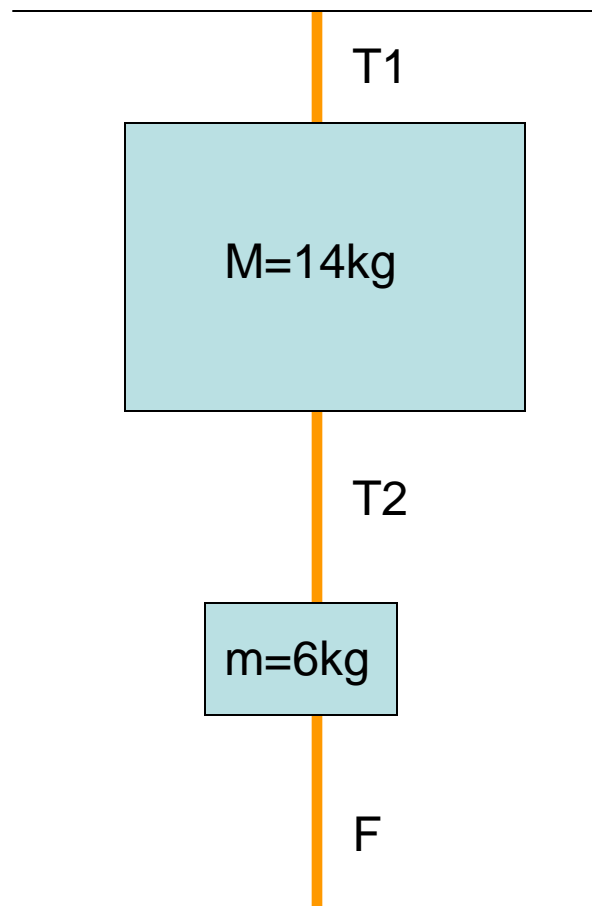
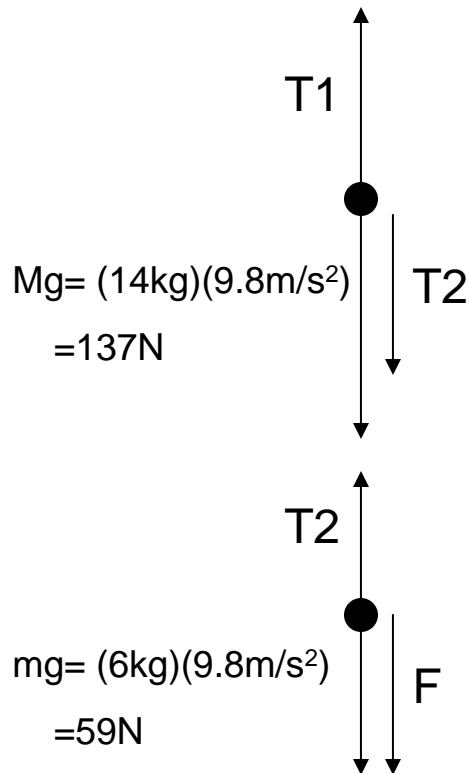


# Physics Problem (Jeffrey Seguritan)

## 1. Free body diagrams



## 2. Newton's 3<sup>rd</sup> law:

- If system in static equilibrium (no motion of masses), then acceleration is zero.
- Let's take convention that acceleration is downward:
  - Large mass:  $(T_2 + Mg) - T_1 = 0$
  - Small mass:  $(F + mg) - T_2 = 0$
- $T_2 = F + mg = F + 59\text{N}$
- $T_1 = T_2 + Mg = (F + 59\text{N}) + 137\text{N}$   
 $T_1 = F + 196\text{N}$
- We know rope tension cannot exceed 256N:
  - $T_1 = F + 196\text{N} < 256\text{N}$
  - $T_2 = F + 59\text{N} < 256\text{N}$

## 3. So now the answer:

- It's seem very clear that  $T_1$  (top string will break first) mainly because it's being tugged down by an extra 137N.
- You can also see that the max  $F$  can be before  $T_1$  breaks is  $256\text{N} - 196\text{N} = 60\text{N}$