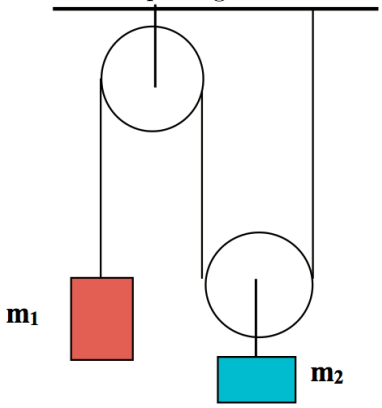
ADVANCED PHYSICS CLUB

NOVEMBER 17, 2019

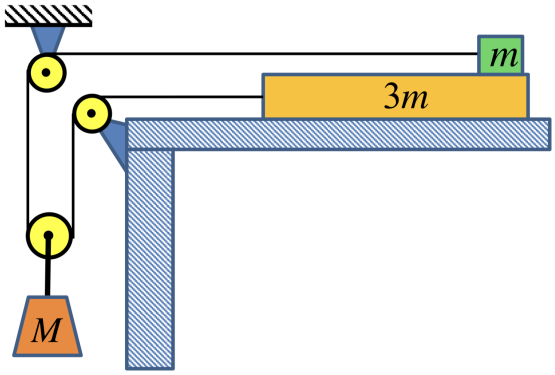
Today's meeting

Today we discussed homework problems from the last meeting. Then we talked about problems on static equilibrium involving pulleys and strings.

1. The system of pulleys shown in the figure is in equilibrium. Find the mass of the weight m_2 if $m_1 = 100$ kg. The ratio m_2/m_1 is called the "mechanical advantage" of the system. Discuss the change in potential energy of the system if one is pulling the mass m_1 down by distance L.



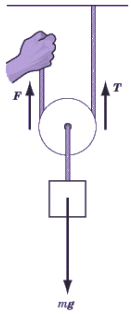
2. Whats the maximal possible acceleration for m? There is no friction, all pulleys are frictionless and massless, all ropes are massless and unstretchable.



3. Design systems of pulleys having the mechanical advantage 4, 6, 3.

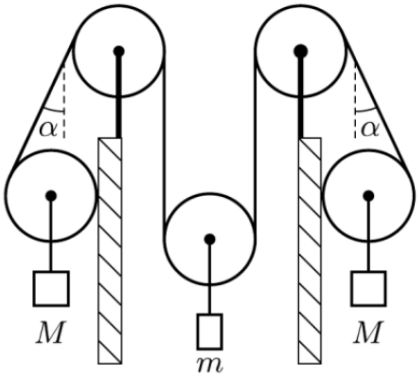
Homework problems

1. A worker lifted the weight to the altitude of 7 m using the pulley and applying to the free end of the rope the constant force $F = 160$ N. What work has the worker performed?



2. Solve problem 11 from $F = ma$ exam 2010:
`https://www.aapt.org/physicsteam/2010/upload/2010_Fma.pdf`

***3.** In the system shown in the figure all pulleys and ropes are ideal. At what values of the mass m and friction coefficient μ between side pulleys and supports the system will be in equilibrium? Will this equilibrium be stable?



And Now for Something Completely Different

***1.** The crescent of the Moon is shown in the figure below. What is the shape of the inner curve of the crescent? Is it an arc of a circle, parabola, hyperbola, or ellipse?

*Can you write the equation of the curve for different lunar phases?