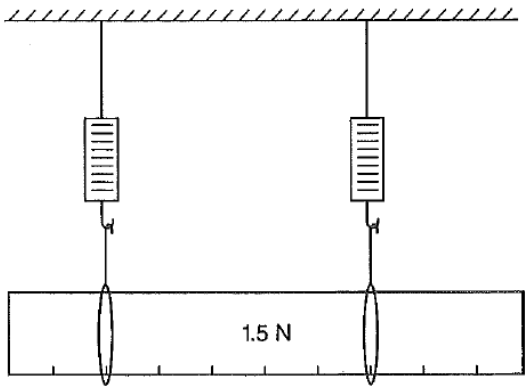
class time to work on 2nd practice AP Physics 1 Exam

NOTE: There are 4 different flavors of AP Physics
We are doing flavor '1'
*not '2'*
*not 'C-Mech'*
*not 'C-E&M'*

I'll work through FRQs #2 (*Qual-Quant*) & #4 (*Paragraph*)




**2. Qualitative-Quantitative Translation** (12 points)

A uniform meterstick, which weighs 1.5 N, is supported by two spring scales. One scale is attached 20 cm from the left-hand edge; the other scale is attached 30 cm from the right-hand edge, as shown in the preceding diagram.

(a) Which scale indicates a greater force reading? Justify your answer qualitatively, with no equations or calculations.

(b) Calculate the reading in each scale.

(c) Now the right-hand scale is moved closer to the center of the meterstick but is still hanging to the right of center. Explain your answers to the following in words with reference to your calculations in (b).

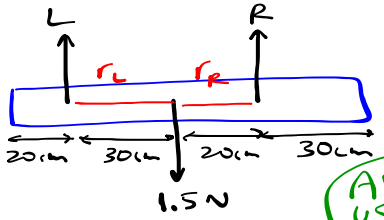
(i) Will the reading in the left-hand scale increase, decrease, or remain the same?

(ii) Will the reading in the right-hand scale increase, decrease, or remain the same?

(d) Now the scales are returned to their original locations, as in the diagram. Where on the meterstick could a 0.2-N weight be hung so as to increase the reading in the right-hand spring scale by the largest possible amount? Justify your answer.

b) $\sum F = 0$

$\sum \tau = 0$




AVOID USING "IT"

$L + R - 1.5 - 0.2N = 0$

$-0.3L + 0.2R = 0$

$\tau_L = \tau_R$

$L r_L = R r_R$

IF $r_L > r_R$ THEN $L < R$

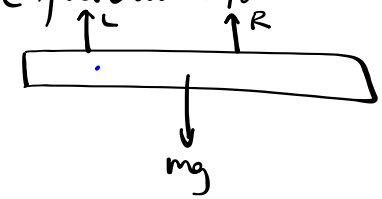
$L = 0.6\,N$

$R = 0.9\,N$

PRETEND THE READER IS A SMART BUT IGNORANT 6TH GRADER

$L + R - 1.5 - 0.2N = 0$

Move fulcrum to L scale location




$\sum \tau = 0$

$-0.3mg + 0.5R - 0.2x = 0$

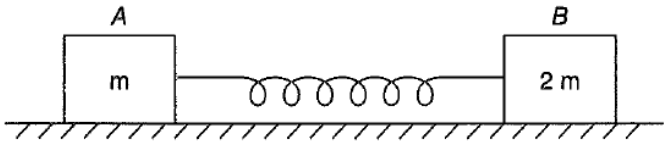
$0.5R = 0.2x + 0.3mg$

$R = \dfrac{0.2x + 0.3mg}{0.5}$

maximize

So, $x \Rightarrow x = 80\,cm$

**4. Short Answer** (7 points)




Two blocks, Block A of mass $m$ and Block B of mass $2m$, are attached together by a spring. The blocks are free to move on a level, frictionless surface. The spring is compressed and then the blocks are released from rest.

Consider two different systems. One system consists *only* of Block A; the other system consists of both blocks and the connecting spring. In a clear, coherent, paragraph-length response, explain whether kinetic energy, total mechanical energy, and/or linear momentum is conserved in each of the systems described.

A

ΔK = 0? ✓

ΔME = 0? ✓

Δp = 0? ✓

A w B

ΔK = 0? NOPE

ΔME = 0? YES

Δp = 0? YES

$v_0 = 0$, so $K_0 = 0$, but after you let go, the blocks move and therefore have some K. K isn't conserved.

ME is conserved unless there's an external force doing work.

p is conserved unless there's an external force imparting impulse.