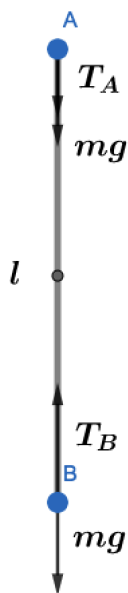# 2018A F=ma Exam: Problem 18

Kevin S. Huang

Applying Newton's 2nd law to points A and B we have

$$T_A + mg = \frac{mv_A^2}{l/2}$$

$$T_B - mg = \frac{mv_B^2}{l/2}$$

We also know from energy conservation that

$$\frac{1}{2}mv_B^2 = \frac{1}{2}mv_A^2 + mgl$$

$$mv_B^2 - mv_A^2 = 2mgl$$

Thus

$$T_B - T_A = \frac{mv_B^2}{l/2} - \frac{mv_A^2}{l/2} + 2mg = \frac{2mgl}{l/2} + 2mg$$

$$\Delta T = 6mg$$

so the answer is $\boxed{C}$.

1