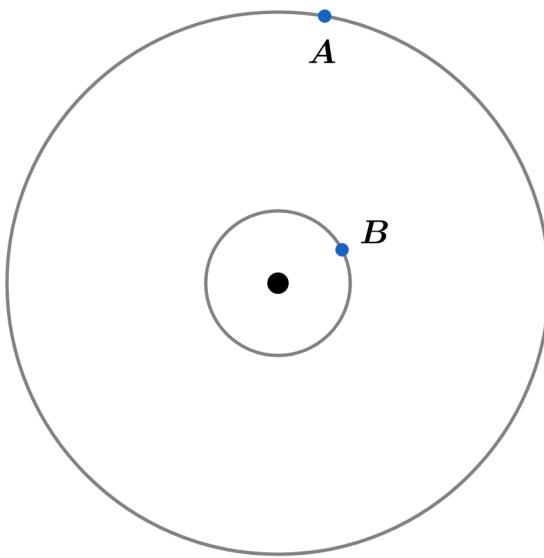


2019B F=ma Exam: Problem 12

Kevin S. Huang



Recall from Kepler's 3rd law that

$$T^2 \propto r^3$$

Since

$$T \propto \frac{r}{v}$$

we have

$$v^2 \propto \frac{1}{r}$$

Then

$$\frac{E_A}{E_B} = \frac{m_A v_A^2}{m_B v_B^2} = \frac{m_A r_B}{m_B r_A} = \frac{2}{3} < 1$$

$$\frac{L_A}{L_B} = \frac{m_A v_A r_A}{m_B v_B r_B} = \frac{m_A}{m_B} \sqrt{\frac{r_A}{r_B}} = 2\sqrt{3} > 1$$

Hence,

$$E_A < E_B$$

$$L_A > L_B$$

so the answer is **[C]**.