12 A satellite travels just above the Moon's surface in a circular orbit. The acceleration at the Moon's surface due to gravity is $\frac{g}{6}$ and the Moon's radius is $\frac{R}{4}$, where g is the acceleration at the Earth's surface due to gravity and R is the radius of the Earth.

If a satellite, travelling just above the Earth's surface has a period T, what is the period of the Moon's satellite?

A $\frac{2T}{3}$ **B** $\sqrt{\frac{2}{3}}T$ **C** $\left(\frac{2}{3}\right)^2 T$ **D** $\sqrt{\frac{3}{2}}T$