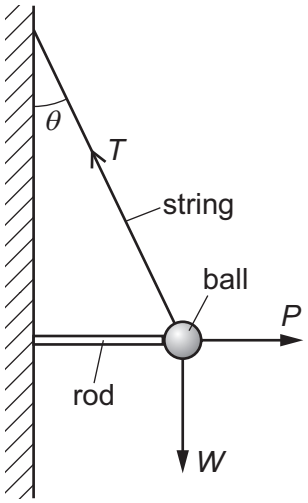
17 The diagram shows a ball of weight W hanging in equilibrium from a string.



The string is at an angle θ to the vertical. The tension in the string is T. The ball is held away from the wall by a horizontal force P from a metal rod.

What is the relationship between the magnitudes of T, P and W?

A $P = T\cos\theta$ and $W = T\sin\theta$

B $T = P + W$

C $T^2 = P^2 + W^2$

D $W = P\tan\theta$ and $W = T\cos\theta$

18 A steel sphere is dropped vertically onto a horizontal metal plate. The sphere hits the plate with speed u, leaves it at speed v, and rebounds vertically to half of its original height. Ignore air resistance.

Which expression gives the value of $\frac{v}{u}$?

A $\frac{1}{2^2}$ **B** $\frac{1}{2}$ **C** $\frac{1}{\sqrt{2}}$ **D** $1 - \frac{1}{\sqrt{2}}$