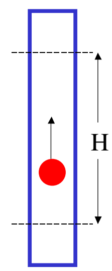
Problems Class 5

The National Physical Laboratory in England measures g by studying the flight of a glass ball in an evacuated tube. The ball is fired up the tube and allowed to move under the influence of gravity. The time intervals between successive crossings of a lower mark, ΔT_L, and a higher mark, ΔT_H, are recorded. If the distance between these two marks is H, show that the acceleration due to gravity is given by the expression:

$$g = \frac{8H}{\Delta T_L^{\ 2} - \Delta T_H^{\ 2}}.$$



Problems Class 5

During a game of snooker, the cue ball is hit towards a red ball, as illustrated below, with impact parameter 2 cm. If the radius of the balls is also 2 cm, and they are both of the same mass, determine whether the red ball will be knocked into the pocket (you may assume that the motion is frictionless and that the balls slide across the surface without rolling). If the speed of the white ball before the collision is 1 ms^{-1}, determine the speeds of the balls after the collision, which you may assume to be elastic.