2 A small ball of mass 34 g is thrown horizontally with a speed of 4.0 m s^{-1}. It falls through a vertical height of 1.96 m before bouncing off a smooth horizontal plate as shown in Fig. 2.1.

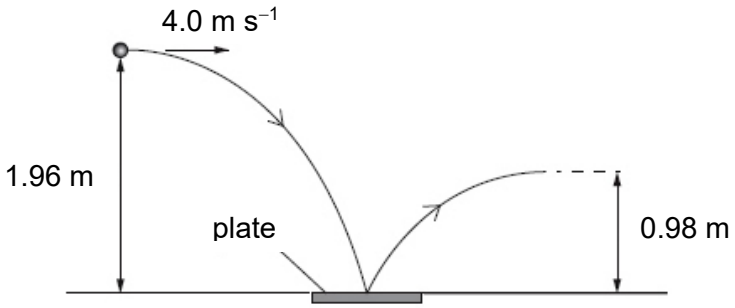

Fig. 2.1

Air resistance is negligible.

(a) Calculate the vertical component of the velocity of the ball when it hits the plate.

vertical component of the velocity = …… m s^{-1} [2]

(b) State and explain the change, if any, in the horizontal component of the velocity of the ball before and after the collision with the plate.

……..……....

……..……....

……..……....

……..……. [2]

(c) Determine the impulse of the ball during the collision.

impulse = …… N s [2]