2 Fig. 2.1 shows the path of a ball that is kicked off the ground towards a vertical wall.

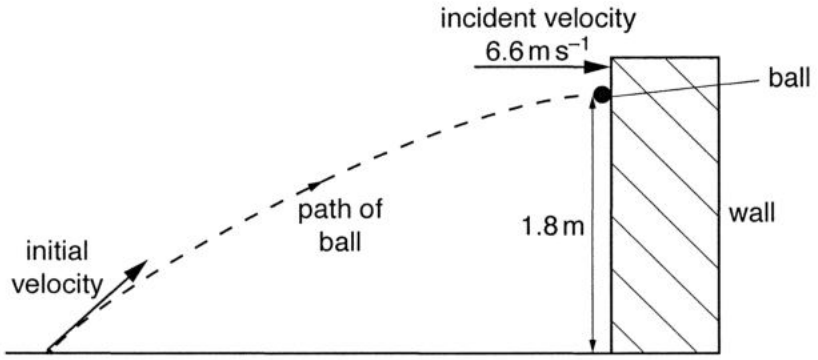

Fig. 2.1

The ball of mass 0.45 kg hits the wall when it reaches its maximum height of 1.8 m. The ball is incident with a horizontal velocity of 6.6 m s^{-1} and rebounds in a horizontal direction with a velocity of 5.2 m s^{-1}. The ball is in contact with the wall for 0.22 s.

(a) Calculate the initial vertical component of the ball's velocity.

vertical velocity = ... m s^{-1} [2]

(b) Calculate the average force acting on the ball due to its collision with the wall.

magnitude of the force = ... N

direction of force on the ball = ... [3]

(c) State and explain whether the collision with the wall is elastic.

.....

.....[1]

For Examiner's Use

(d) Explain why the ball does not rebound to the point on the ground from where it was kicked.

.....

.....

.....[2]

[Turn over