1 A toy car of mass 0.42 kg is released from rest and accelerates along a straight track towards a wall. It hits the wall and rebounds in the opposite direction. The variation with time t of the momentum p of the toy car when not in contact with the wall is shown in Fig. 1.1

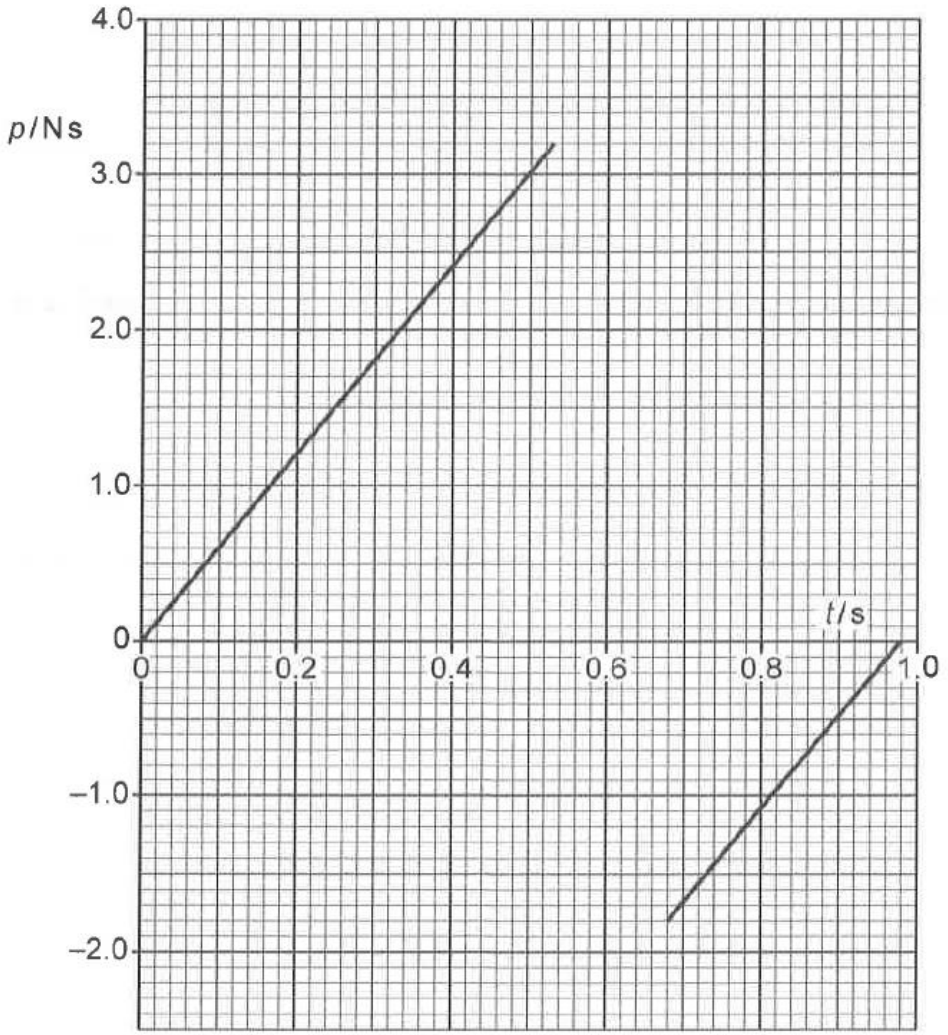

Fig 1.1

(a) Using Fig 1.1, calculate the impulse acting on the toy car during the collision.

impulse = …….. N s [2]

(b) Calculate the magnitude of the average acceleration of the car during the collision and state the direction of this acceleration relative to the initial motion of the car.

average acceleration = ……..m s^{-2}

direction = ……..…… [3]

(c) Explain why the collision was inelastic.

……...

……..

……..

……..

……. [2]

(d) Calculate the percentage change in the kinetic energy of the car as a result of the collision.

percentage change = …… % [3]

[Total: 10]