17 A student carried out experiments on momentum using two table hockey pucks, as shown.

The pucks each contain a small fan, so that they glide across the table on a cushion of air. The mass of the pucks can be varied by attaching small masses.

In each experiment, the student pushed one puck towards a stationary puck.

(a) In one experiment, the first puck reached a speed of $0.35\,m\,s^{-1}$ after being pushed for a time of 0.28 s.

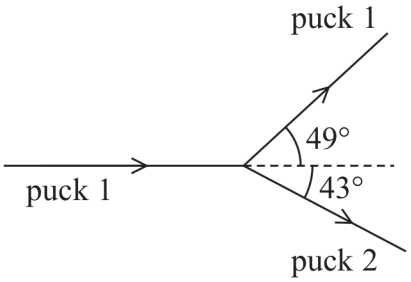
Calculate, using the idea of impulse, the average force used to accelerate the first puck.

mass of puck = 110 g

(3)

Average force = ...

(b) In another experiment, the first puck was pushed towards the stationary puck with a speed of $0.41\,m\,s^{-1}$.
The paths of the pucks before and after the collision are shown. The paths are labelled puck 1 and puck 2.



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(i) Calculate the speed of puck 2 after the collision.

mass of puck 1 = 110 g

mass of puck 2 = 130 g

speed of puck 1 after collision = $0.28\,m\,s^{-1}$

(4)

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Speed of puck 2 = ...

(ii) Deduce whether this was an elastic collision.

(3)

(c) Explain the assumption made when applying the principle of conservation of momentum to collisions.

(2)

(Total for Question 17 = 12 marks)