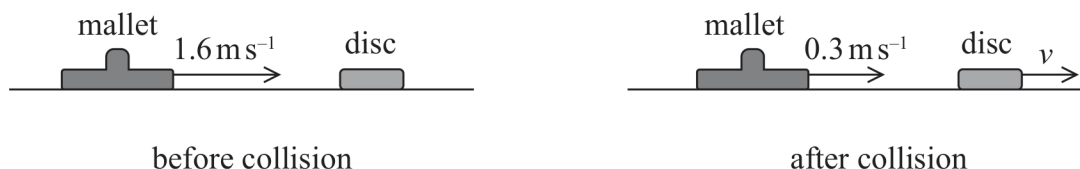


- 18 A game is played where each player must use a 'mallet' to hit a disc across a table into the opponent's goal.

One player accidentally lets go of a mallet. The mallet travels at a speed of  $1.6 \text{ m s}^{-1}$  and collides with a stationary disc.

After the collision, the mallet continues in the same direction at a lower speed of  $0.3 \text{ m s}^{-1}$ . The disc moves in the same direction as the mallet with a velocity  $v$ , as shown.



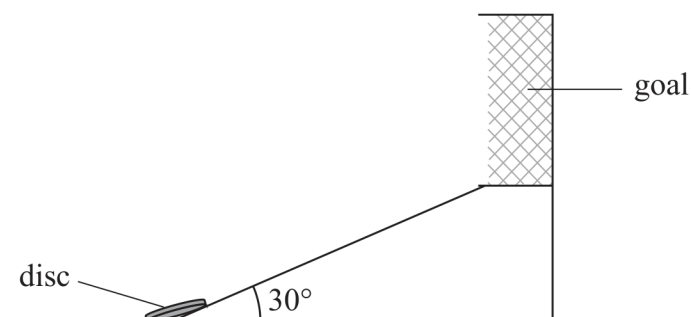
- (a) Calculate a value for  $v$ .  
Assume that frictional forces are negligible.

mass of disc =  $0.035 \text{ kg}$   
mass of mallet =  $0.17 \text{ kg}$

(3)

$v =$  .....

- (b) To reach the goal, the disc must move up a ramp which is at an angle of  $30^\circ$  to the horizontal.



The velocity of the disc at the bottom of the ramp is  $5.0 \text{ m s}^{-1}$ . The disc moves up the ramp and work is done by the disc against the frictional force. The disc moves a distance of 6.5 cm up the ramp before moving back down.

Determine the frictional force acting on the disc.

(6)

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Frictional force = .....

(Total for Question 18 = 9 marks)