**3** Two balls, X and Y, move along a horizontal frictionless surface, as illustrated in Fig. 3.1.

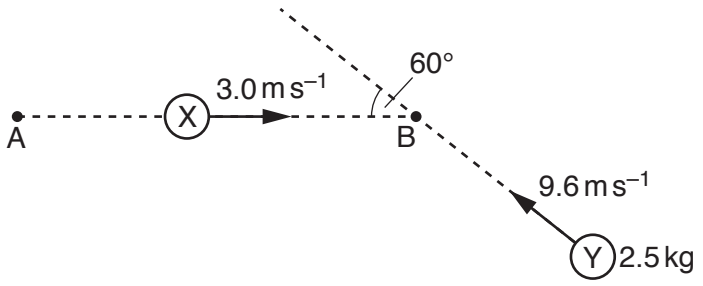


**Fig. 3.1** (not to scale)

Ball X has an initial velocity of $3.0\,m\,s^{-1}$ in a direction along line AB. Ball Y has a mass of 2.5 kg and an initial velocity of $9.6\,m\,s^{-1}$ in a direction at an angle of 60° to line AB.

The two balls collide at point B. The balls stick together and then travel along the horizontal surface in a direction at right-angles to the line AB, as shown in Fig. 3.2.

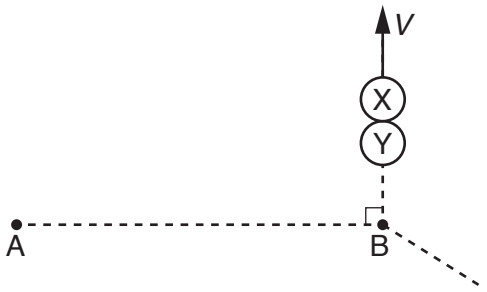


**Fig. 3.2**

**(a)** By considering the components of momentum in the direction from A to B, show that ball X has a mass of 4.0 kg.

[2]

**(b)** Calculate the common speed $V$ of the two balls after the collision.

$V$ = ..... $m\,s^{-1}$ [2]

**(c)** Determine the difference between the initial kinetic energy of ball X and the initial kinetic energy of ball Y.

difference in kinetic energy = ..... J [2]

[Total: 6]