

- 2 (a) Define *momentum*.

.....  
 ..... [1]

- (b) Two balls X and Y, of equal diameter but different masses 0.24 kg and 0.12 kg respectively, slide towards each other on a frictionless horizontal surface, as shown in Fig. 2.1.

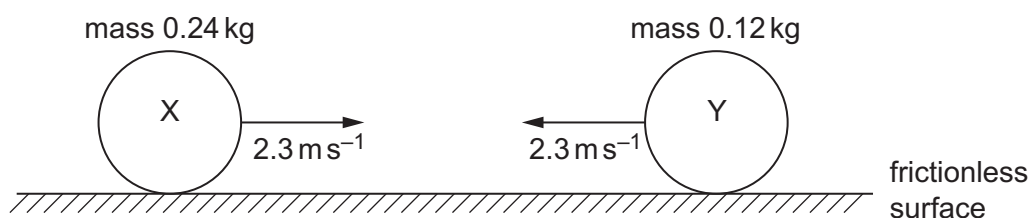


Fig. 2.1

Both balls have initial speed  $2.3 \text{ m s}^{-1}$  before they collide with each other. Fig. 2.2 shows the variation with time  $t$  of the force  $F_Y$  exerted on ball Y by ball X during the collision.

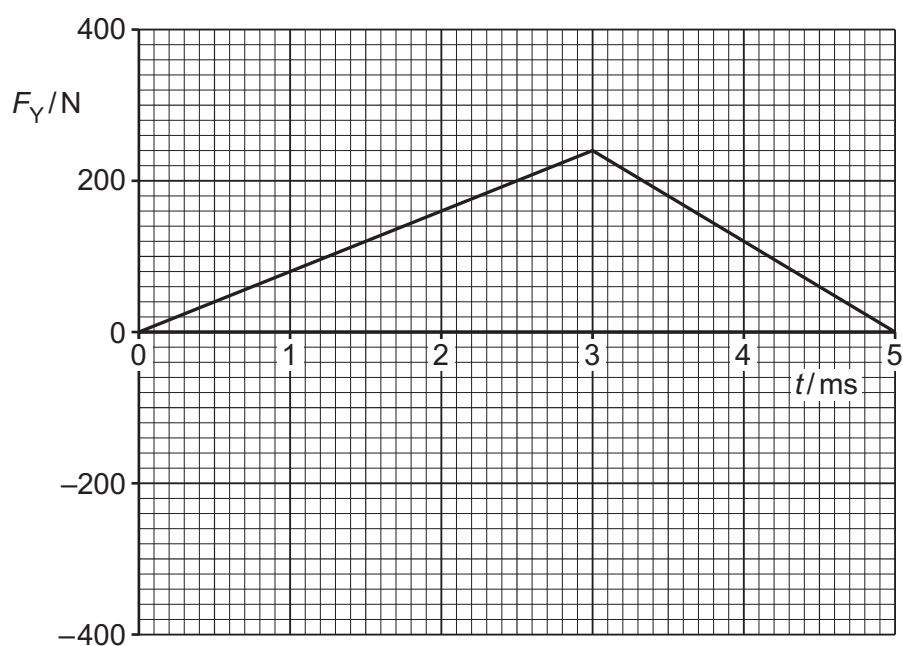


Fig. 2.2

- (i) Calculate the kinetic energy of ball X before the collision.

kinetic energy = ..... J [3]

- (ii) The area enclosed by the lines and the time axis in Fig. 2.2 represents the change in momentum of ball Y during the collision.

Determine the magnitude of the change in momentum of ball Y.

change in momentum = ..... N s [2]

- (iii) Calculate the magnitude of the velocity of ball Y after the collision.

velocity = .....  $\text{ms}^{-1}$  [2]

- (c) On Fig. 2.3, sketch the variation with time  $t$  of the force  $F_X$  exerted on ball X by ball Y during the collision in (b).

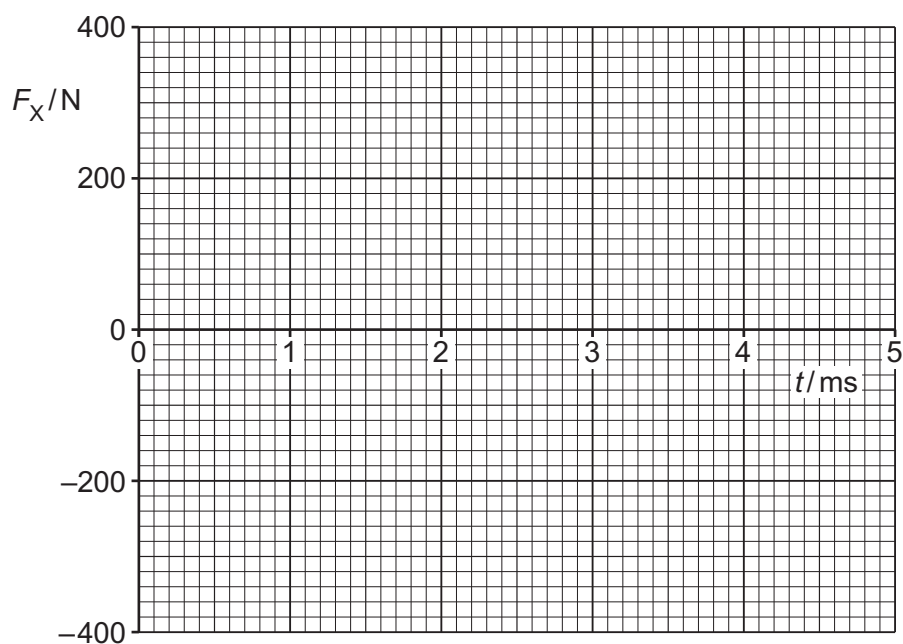


Fig. 2.3

[3]

[Total: 11]