

- 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.

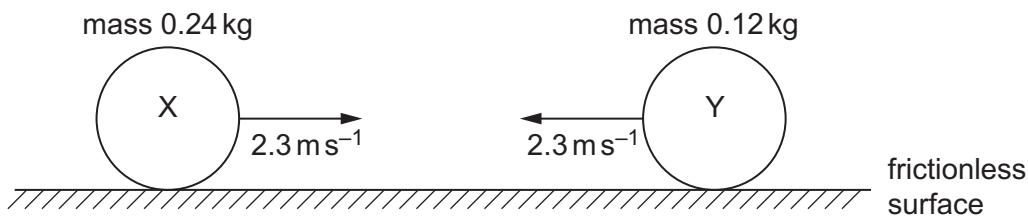


Fig. 2.1

Both balls have initial speed 2.3 ms^{-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.

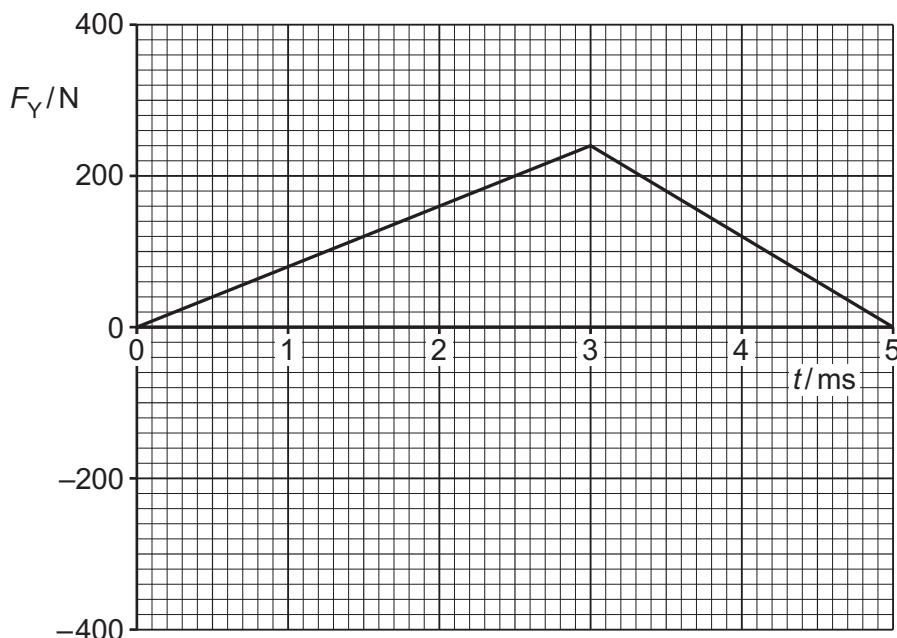


Fig. 2.2

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

$$\text{kinetic energy} = \dots \text{ J} [3]$$

- (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.

$$\text{change in momentum} = \dots \text{Ns} [2]$$

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

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

- (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).

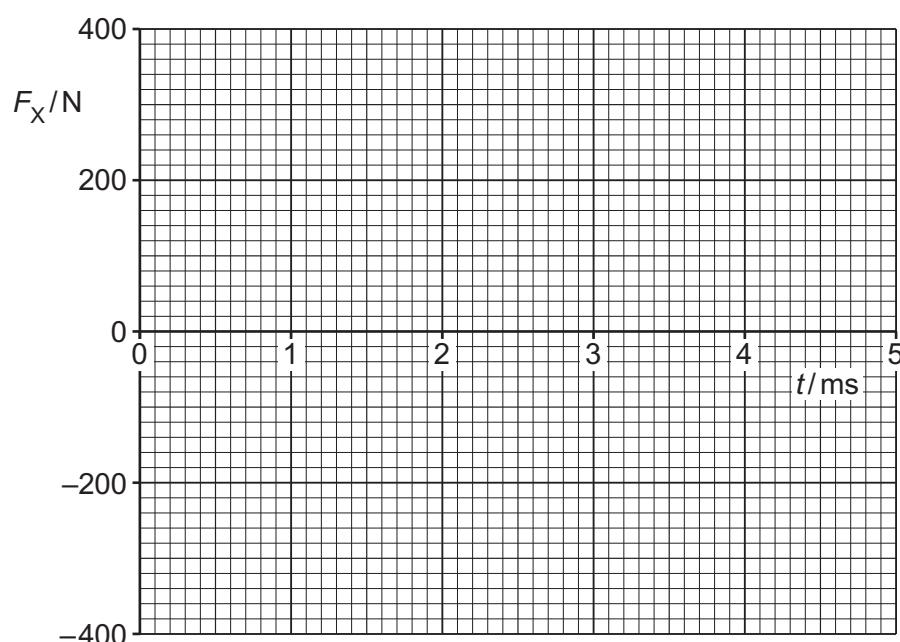


Fig. 2.3

[3]