

- 2 Fig. 2.1 shows two skaters A and B moving along the same straight line towards each other in an amusement park with speeds of  $11 \text{ m s}^{-1}$  and  $5.0 \text{ m s}^{-1}$  respectively just before they collide. The masses of skaters A and B are  $60 \text{ kg}$  and  $90 \text{ kg}$ , respectively.

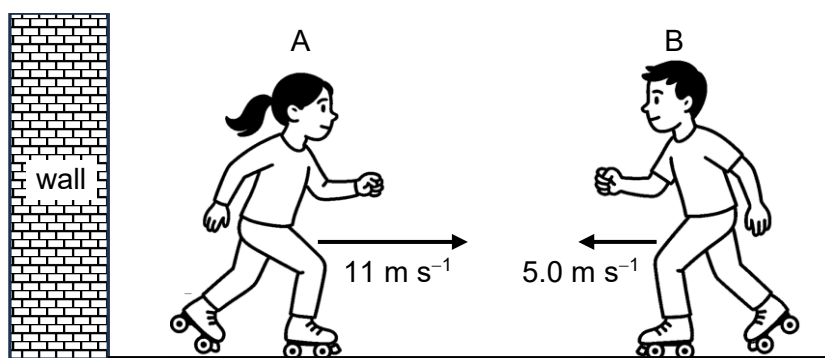


Fig. 2.1

- (a) State the *principle of conservation of momentum*.

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

- (b) Assuming that the collision is elastic, show that skater A moves towards the left with a speed of  $8.2 \text{ m s}^{-1}$  after the collision.

[2]

(c) After the collision, skater A hits the wall and bounces off the wall with a speed of  $1.0 \text{ m s}^{-1}$ .

(i) The variation with time  $t$  of the force  $F$  that the wall exerts on skater A is shown in Fig. 2.2.

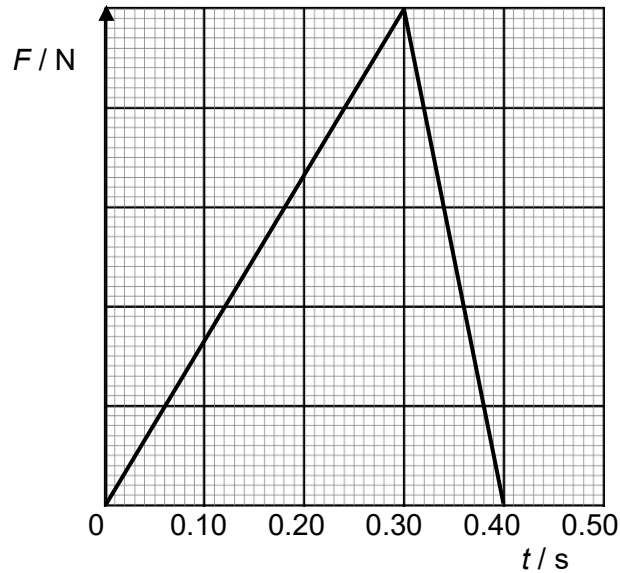


Fig. 2.2

Determine the maximum force exerted by the wall on skater A.

maximum force = ..... N [2]

(ii) Explain how the walls in the amusement park can be made safer so that the maximum force exerted on the skater is reduced.

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 .....  
 .....  
 ..... [2]