2 Two frictionless trolleys A and B approach each other along a horizontal straight line, as illustrated in Fig. 2.1.

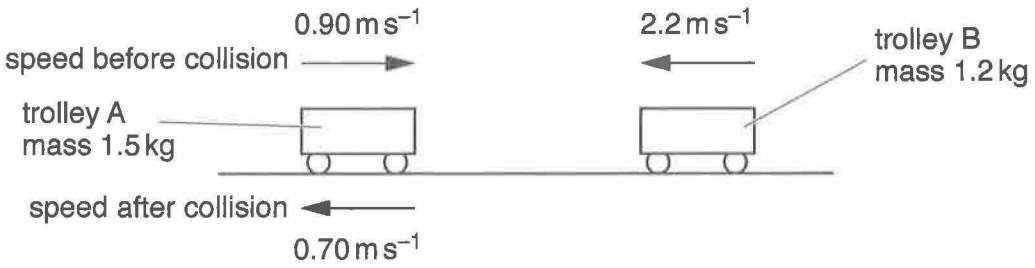

Fig. 2.1

Trolley A has mass 1.5 kg and is moving towards trolley B with a speed of 0.90 m s^{-1}. Trolley B has mass 1.2 kg and moves towards trolley A with a speed of 2.2 m s^{-1}.

The trolleys collide and are in contact for a time of 0.30 s.

Trolley A reverses its direction of motion and moves off with a speed of 0.70 m s^{-1}.

(a) For the time during the collision,

(i) suggest and explain whether both trolleys could be stationary at the same time,

.....

.....

..... [2]

(ii) calculate the average force F between the trolleys.

F = ... N [2]

(b) (i) Use your answer in **(a)(ii)** to calculate the speed of trolley B after the collision.

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

(ii) Use your answer in **(b)(i)** to state and explain the direction of the motion of trolley B.

.....

.....

..... [1]

(c) By considering quantitatively the relative speeds of approach and of separation of the two trolleys, deduce whether the collision is elastic or inelastic.

.....

..... [2]